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Normal Capacity of Turret Lathe Increased

Offset Chuck Jaws Effect Nearly Double Production—
Combining Operations Improves Quality of
Product

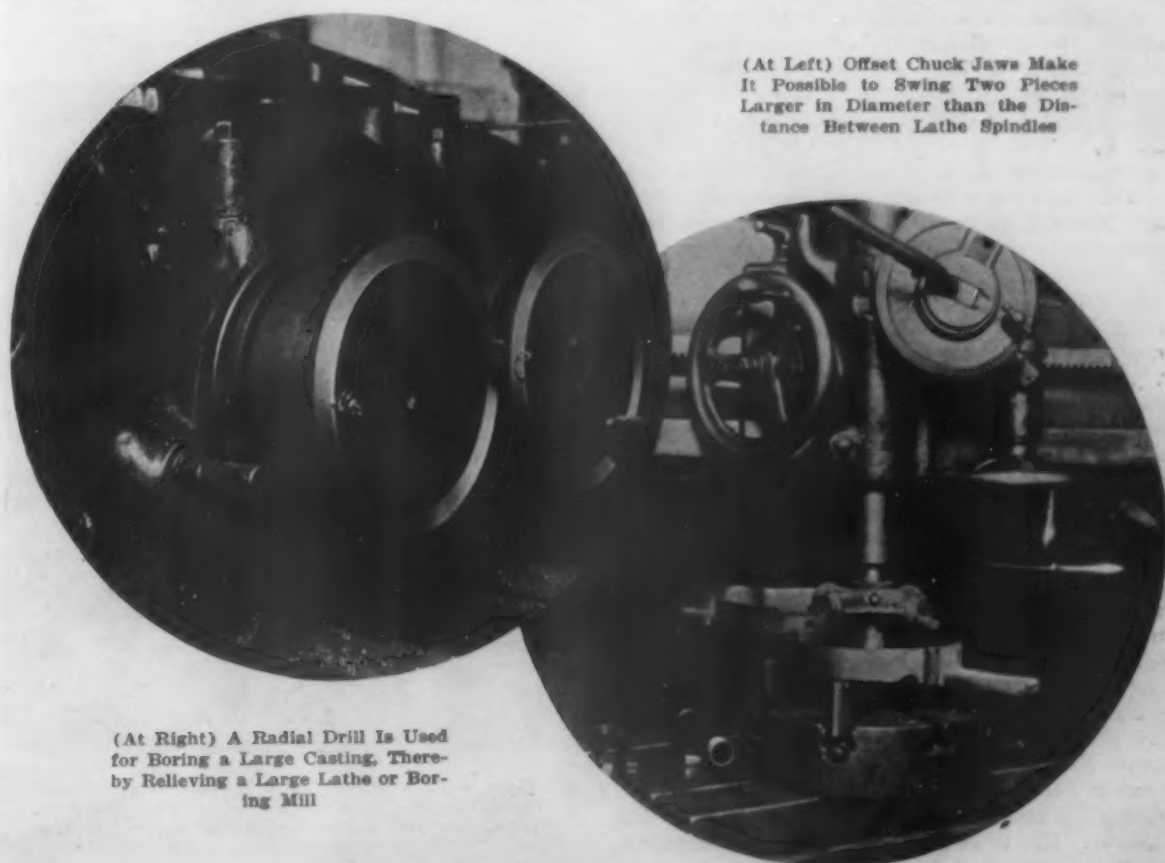
BY L. S. LOVE

ORDINARILY multiple spindle machines are limited in their use to work which is less in diameter than the distance between spindle centers, as it has been considered that interference would prevent the swinging of work of larger diameter. This need not always be the case, however, as is evidenced at the plant of the Coldwell Lawn Mower Co., Newburgh, N. Y., manufacturer of hand, horse and gasoline operated lawn mowers.

Some of the power mowers call for use of sprockets which are finished to an outside diameter of 11.463 in. These are made of open-hearth steel of 0.15 to 0.25

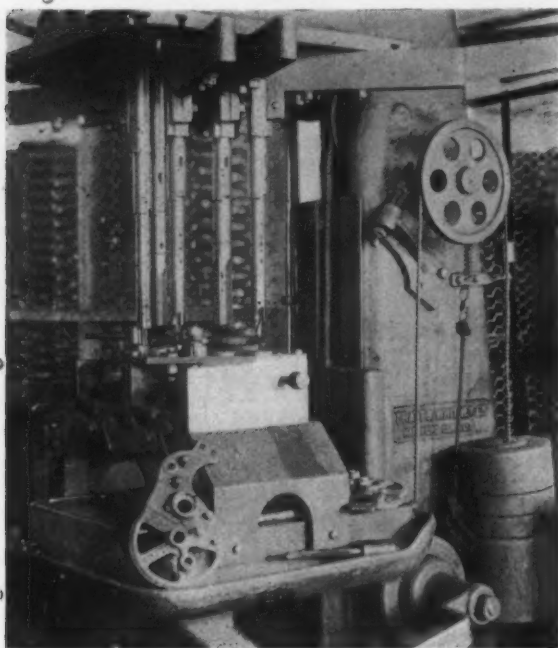
per cent carbon. The operation is facing, boring the hole, which is $2\frac{1}{4}$ in., and beveling the edge to a radius of $9/16$ in. The distance between centers of spindles in the two-spindle flat turret lathe used is sufficiently great normally to permit the swing of work 10 in. in diameter where both spindles are used.

To handle these larger disks the chuck on the far side of the machine is provided with extension type offset-jaws which overlap the work chucked on the near spindle. Tools are so set in the turret on the far side as to compensate for this difference in work level. In comparison with the former method of doing this work



(At Left) Offset Chuck Jaws Make It Possible to Swing Two Pieces Larger in Diameter than the Distance Between Lathe Spindles

(At Right) A Radial Drill Is Used for Boring a Large Casting, Thereby Relieving a Large Lathe or Boring Mill



Three Extra Operations Have Been Added in a Multiple Drilling Set-Up on a Pair of Side Frames, thus Avoiding Additional Handling

in a single-spindle machine, the production has been increased about 90 per cent from one machine and one operator.

To facilitate stopping of the spindle when necessary to rechuck, in a screw machine being used on chucking work, a novel brake has been developed. This was done without any great cost for special parts and without materially altering the standard construction of the machine. This tool is of the friction back-geared type. On the class of work in which the machine is employed open belt speeds are used, so that back gears are not required. The spindle gear, however, is used as a brake, in that it is held stationary and the friction pulled into it, when it is desired to make a quick stop for changing the work. Holding the gear is accomplished by a brass gear sector, of the same pitch as the gear, attached to the inside of the headstock casting. This, meshing with the spindle gear, locks it in place. When it is desired to use the friction back gear the gear sector may be removed, thus converting the machine back to standard.

Side frames of horse-drawn mowers are castings of bulky shape which are subject to one light machining operation. This is the boring or removal of scale from that part of the frame which houses the main gear. Rather than tie up a large lathe or boring mill, which would be necessary to swing the long extension of the frame, the work is done under an ordinary radial drill. A special cast tool holder has been made, so designed that it may carry four bits. These are set to produce the desired diameter of bore to clear the gear. The tool holder is provided with a standard taper shank to fit the drill spindle.

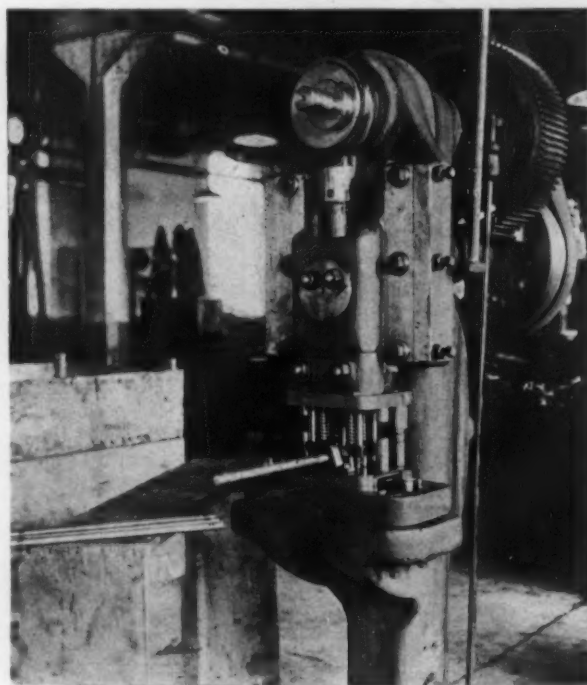
In making tie rods, used to bind the two side frames of the mower together, until recently two styles were in process. In the higher grade mowers the rods were hollow milled and threaded on the ends, there being two diameters, with a shoulder between the portion hollow milled for the fit in the frame and the portion threaded for the nut. This operation was performed one end at a time in a turret lathe. In the lower priced machines the tie rods were simply held in place with set screws. Due to an improved method of machining, the better design of tie rod has been standardized for

all mowers, making not only a standard single design of rod to be made, but also permitting the use of the better rod in the lower priced mowers, thereby improving their construction.

This new manufacturing method is possible with the use of a special two-spindle machine, similar in appearance to a double-end centering machine. A chuck or vise in the middle of the bed grips the rods, which have been cut to length from cold-rolled steel or screw stock. At each end of the bed is an adjustable sliding head, carrying a spindle provided with a rack feed. These spindles are equipped with combination hollow mills and self-opening die heads. The hollow mills are furnished with Stellite cutters and the die heads with high-speed chasers. The hollow milling cutters, being in advance of the thread chasers, mill the rod ends in preparation for the thread cutting and also mill them back sufficiently to provide the bearings for the side frames. This method does not effect a tangible saving, due to the fact that more of the milled and threaded rods are made now than formerly. It is considered that the machine was a profitable investment, however, in that it has reduced to one style the rods to be made, and has permitted use of the better rod as a standard in all mowers at no increased cost.

Saving Rehandling Costs

Another case in which combining tools did not show a cost reduction on the actual operation, but did save in rehandling charges, is on the side frames. It was formerly the practice to bore a pair of frames, right and left, held in one jig under a multiple-spindle drill. The holes were those for the tie rods and for the lower knife bar, making four holes for the two frames. These side frames come to the drill from a turret lathe operation in which the reel or revolving knife bearings are bored, reamed and faced in the case of plain-bearing machines; or bored, faced and counterbored in the case of ball-bearing machines. The back facing in this operation is accomplished by a tool through the spindle, avoiding necessity for rechucking.



Drifting a Slot in a Round Bar Is Done under a Punch Press after Two Holes Have Been Drilled. The holes form the slot ends and the material between is removed by the punch



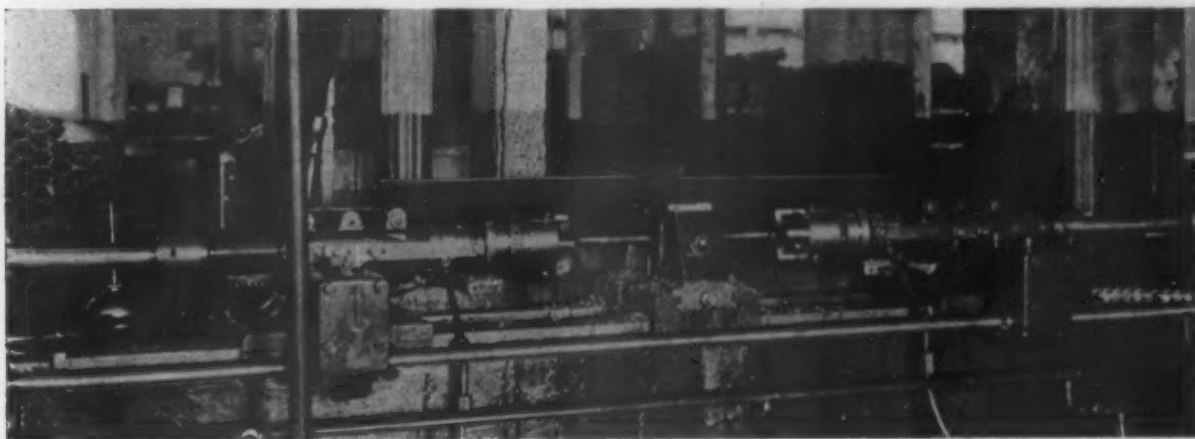
Revolving Blades Are Formed in a Hand Bending Machine to Conform to the Desired Spiral

They are registered from these finished bearings in the drill press fixture. Three extra operations have been added, to be performed in one setting. Combina-

on order, to drill in one operation all four holes for these slots.

A very simple, economical and satisfactory method of curving reel blades to spiral form is in use in this plant. The blades first are punched with holes for riveting to the flanges of the reel spiders, after which they are heated for bending. A cylindrical casting with former plates attached, and mounted in bearings on a cast bed, stands on floor legs to secure proper height for working. The furnace tender places a heated blade on the former and his helper throws down a clamp to grasp one end. While the furnace man holds a roller down on the blade so that it will follow the form, his helper by means of a crank turns the cylinder in its bearings, thus transferring the spiral form to the heated blade.

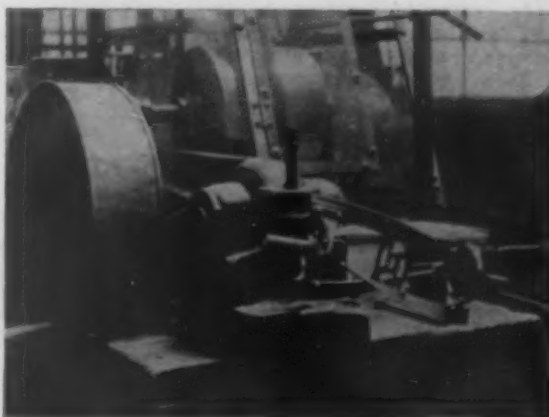
After a tumbling operation the blades go to be riveted to the flanged spiders, which operation is performed in special machines. These are jaw riveters with an action which resembles that of an alligator shear. The lower jaw, stationary, is provided with an ordinary rivet set. The upper or rocking jaw has a tool steel adjustable screw type of rivet set. This permits adjustment for different sizes of rivets. The rocking jaw, with the rivet set adjusted to proper extent, closes just enough to produce the desired head on the rivet.



Tie Bars Are Hollow Milled and Threaded on Each End in One Operation in a Special Machine with Combination Mill and Die Heads

tion drill and facing tools are used for the tie bar and lower knife holder holes. Also the wheel bearing hole is reamed. The time required is slightly greater for the six holes, as compared with the former four. Production has been reduced about one-third. However, the extra handling which is eliminated more than offsets the reduced production.

In the operating mechanism of the ordinary hand mower is a pawl which bears inside of the pinion meshing with the main wheel gear. This pawl slides through a slot in the pinion bearing. The inside of the pinion casting has three cams on which the pawl rides, so that when the gear is turned in one direction the reel is turned. When the gear is revolved in the other direction the cams permit the pawl to slip back and forth in its slot without turning the reel. To produce the pawl slots, two closely adjacent holes are drilled in each end of the shaft, which then is inserted in a double-acting die under a punch press. This die serves to register the shaft in place and hold it down, when the further motion of the press and die serves to drift out or broach the material from between the two holes, thus producing the desired slot. A new machine is now



Special Riveting Machines Resembling Alligator Shears Are Used to Rivet Revolving Blades to the Flanged Spiders. One of the rivet sets is adjustable for height or length of rivet to be headed

TRAINING FOR INDUSTRY

Education of Apprentices—Measure of the Number Annually Required

In discussing before the American Society of Mechanical Engineers the subject of education and training for American industry, Magnus W. Alexander, managing director, National Industrial Conference Board, New York, stressed the need for training as a service to society. He pointed out that the 1920 census showed 12,818,000 people engaged in manufacturing and mechanical trades, to which should be added about 150,000 of the 600,000 professional men and technical experts reported by the census. Of the number listed, he placed in the several groups the following numbers:

Managerial group	520,000
Foremen and overseers	307,000
Artisans, varying in skill	5,267,000
Semi-skilled workers	3,636,000
Laborers	2,944,000
Apprentices in training	144,000

Study has shown that the average increase, year by year, in the number of persons in industry is about 3½ per cent. The death rate figures out about 1 per cent. An additional ½ per cent net represents those

leaving industry by promotion, retirement or otherwise. Thus 5 per cent must be added annually to cover the normal increase plus the losses. This gives us a measure on which we may predicate the number who should be trained, year by year.

The most thorough and complete method of producing skilled artisans is through the apprentice training system supplemented by the upgrading of those already in industry. This is not always adequate, however, for the larger phases of industrial advancement. Inasmuch as apprentice training courses require three or four years, this means that the number in such courses should be from 15 to 20 per cent of the number of skilled workers, whose depleting ranks they are to fill.

Not all of the 5,267,000 reported as skilled workers actually rank as such. Omitting those too highly graded in the census reports, Mr. Alexander estimated that 4,500,000 might be a fair figure. This would require from 675,000 to 900,000 apprentices continually in training. If we add to the 144,000 apprentices who were in training in 1920, the 142,000 enrolled in industrial schools, this still leaves us 390,000 short of the lowest figure given for our needs. If we had this additional 390,000 we would pass into industry each year from 100,000 to 130,000 of trained operatives.

Tribute to George F. Baker

George F. Baker, a director and member of the finance committee of the United States Steel Corporation, also chairman of the board of the First National Bank of New York, was honored in an unusual way at a luncheon in the Bankers' Club, New York, by the Bond Club, on Dec. 4. About 1000 financiers, railroad men, industrial leaders and bankers who attended, rose to acclaim Mr. Baker "the first citizen of New York." This was marked as a celebrated occasion, when it became known that Mr. Baker was to make his first public speech, breaking a silence which Wall Street had come to recognize as proverbial.

Judge Elbert H. Gary, one of the principal speakers, paid a fine tribute to Mr. Baker, of whom he said: "Great in business success, very generous in benefactions for the public good, unusually helpful in every time of public need and distress, patriotic, loyal, true, steadfast, a good citizen, a staunch friend, we acclaim George F. Baker, all in all, the first citizen of New York."

"George Baker, modest, unobtrusive, courageous and confident, has been conspicuous in contributing to the growth and prosperity of this country, for which succeeding generations will be proud and grateful, and better even than that, he has builded for himself a monument in the hearts of multitudes of men and women, who in response to the tender impulses of Mr. Baker's own nature, respect, admire and love him. He has, by reason of his lifelong, everyday, frank, courteous, fair and honest attitude in his contact with others, secured a standing and reputation as a financier and as a citizen and neighbor that has never been excelled."

Additions of McWane Cast Iron Pipe Co.

BIRMINGHAM, ALA., Dec. 9.—The McWane Cast Iron Pipe Co., East Birmingham, has let contracts and started work on a new machine shop, extension of the foundry and a new sand storage warehouse. The machine shop will have more than twice the capacity of the present shop. The building will be of fireproof construction, steel frame with metal sash and designed for the maximum light and ventilation.

The expansion is due to the growing demand for the company's products. The business was started in 1922 and this is the second large addition.

The Wellman-Seaver-Morgan Co., Cleveland, has taken an order from the Carnegie Steel Co. for a special stationary turnover car dumper, to be erected at the Carrie furnaces, Rankin, Pa.

Stove Manufacturers at Birmingham

BIRMINGHAM, ALA., Dec. 9.—The regular quarterly meeting of the Southern Association of Stove Manufacturers, J. F. James, Chattanooga, president, and W. H. Clever, Louisville, secretary, will be held in Birmingham Dec. 15-16. The furnace companies of the Birmingham district will tender the association a banquet at the Tutwiler Hotel the evening of Dec. 15, and the stove makers will be shown industrial plants, especially blast furnaces, during their stay here. Upward of 35 to 40 stove manufacturers are expected at the meeting.

Plans of the Ford Motor Co. for Its Plants at St. Paul, Minn.

W. B. Mayo, chief engineer, Ford Motor Co., Detroit, has issued a statement in regard to the proposed construction of blast furnaces, steel plants and finishing plants at St. Paul. Mr. Mayo's statement is as follows:

The \$10,000,000 plant is a beginning for an industrial development that will include the manufacture of steel.

The Ford Motor Co. recently completed a survey of all factors entering into the cost of making steel at the St. Paul plant, and Henry Ford is of the opinion that the survey demonstrates steel can be manufactured and distributed west of the Mississippi comparatively cheaper by a Twin City plant.

The assembling and manufacturing plant was conceived as a distribution center for the area roughly described as the northwest, but the company sees a much greater distribution area for the steel plant by boats on the Mississippi.

The survey refutes the old contention of eastern steel manufacturers that the cost of hauling coal to a steel plant near the ore is equal to hauling ore to the plant situated near the coal. The basic cost is materially less in Minnesota near the ore.

Four coal hauling motorships are now owned by the company and more will be added to feed the furnaces at the Twin City plant, and the Milwaukee railroad leading direct from the ore field into the plant lays the basis for the development planned.

Half of the plant now being built to be used for manufacturing, will be devoted to automobile parts.

Employment in Cleveland in 100 large plants increased 1.06 per cent in November, these plants adding more than 1000 to their working forces, according to the report of the labor relations committee of the Cleveland Chamber of Commerce. Forty-two iron and steel and metal working plants increased their number of employees nearly 5 per cent. The average working day was increased ½ hr. as the result of an increase in working hours.

Diverse Program at Engineers' Meeting

Machine-Shop Practice and Management Subjects Discussed

—Research on Metal Springs to Be Conducted—Sessions on Oil, Gas and Steam Power

MORE than 50 papers on a wide variety of subjects were contributed at the 19 sessions of the forty-fifth annual meeting of the American Society of Mechanical Engineers, held at the Engineering Societies Building, New York, Dec. 1 to 4.

A large number of committee meetings were held, also, and a social program and excursions were a feature as heretofore. There was a joint session with the American Society of Refrigerating Engineers and two with the Taylor Society. The sessions were well attended and there was considerable discussion, both formal and informal. Abstracts of some of the papers are given below, and others elsewhere in this issue.

Hardness Testers Being Studied

A paper under the title of "Comparison of Herbert Pendulum Hardness Tester With Other Hardness Testers" was read by J. O. Keller, professor industrial engineering, Pennsylvania State College, at a session on research in machine design and operation, held under the auspices of the research committee on cutting and forming of metals and the machine shop practice division.

The tests for the investigation of hardness testers were made with the cooperation of several institutions and all of the data have not yet been coordinated. Mr. Keller's paper, therefore, was more in the nature of a progress report than a complete account of the tests. Samples of $\frac{1}{4}$ -in. drill rod furnished by the Cleveland Twist Drill Co. were sent to the Pratt & Whitney Co., Hartford, where various tests with file, Shore scleroscope, Brinell, Rockwell and Herbert pendulum tester were conducted, microphotographs of the samples being also made. Magnetic analysis of the samples was made by A. V. DeForest at the American Chain Works, Bridgeport. Samples 18 in. long were sent to the University of Cincinnati, where dynamometer tests are being made on both a lathe and a drill press, similar tests being run also on a milling machine at the Cincinnati Milling Machine Co. Complete tensile tests will be made to determine not only the tensile strength, obtain the stress and strain diagram and ultimate strength, but also to ascertain the modulus of resilience, the ductility and the reduction of area for each specimen.

The test figures were submitted as "giving some light" on the claims of the Edward G. Herbert Co., Ltd., Manchester, England, that its "pendulum" will not only measure indentation hardness, but also "machinability" and resistance to work hardening. The action and theory of the Herbert tester which was described in THE IRON AGE of May 31, 1923, were taken up at length, and the advantages and disadvantages of the instrument discussed. The standard equipment accompanying the apparatus was said to make the Herbert tester more of a laboratory than a production machine, but with the operating stand, recently developed, the instrument is adapted for rapid inspection testing. The author explained that there were too few specimens to compare the Herbert pendulum with other methods and that after further tests the Pennsylvania State College expects to publish a bulletin giving further data. The Herbert pendulum was characterized as a most useful instrument.

Metal Springs to Be Subject of Research

At the same session a preliminary progress report of the society's special research committee on metal springs, which was organized at the Cleveland meeting

this year, was presented briefly by J. K. Wood, consulting engineer, New York, chairman. The purpose of this committee is to determine the present status of the metal-spring art; to promote and conduct research which will place the design of springs on a more authoritative basis, and to develop the art to the point of standardization. The preliminary report made by Mr. Wood outlined the status of the art of making mechanical springs, covering both the design and the manufacture of all types used in the principal mechanical industries. A program of research is suggested. Future progress reports will include data on the calculation of spring dimensions, materials for springs, methods of manufacture, specifications and inspection.

A paper on "Mechanical Springs" was presented by Mr. Wood at another meeting, which was held under the auspices of the machine-shop practice division. The subject was treated "collectively in the hope of clarifying theories of design and of assisting in the ultimate standardization of springs." After defining a mechanical spring and a mechanical spring material the paper discusses the general cases of a unit cube stretched by a tensile force, of replacing the cube by a bar, and of applying the load transversely. From these are established load-deflection-rate formulas for flexure and torsion. Formulas for safe maximum load, deflection and work are then derived in general terms containing constants which may be determined for stress method, material, form, etc. Under spring requirements of mechanical design, load-deflection characteristics are first considered, followed by those for safe maximum load and deflection and safe maximum work of resiliency. The adaptability of springs to the requirements of mechanical design and the constants of material, dimension, stress method, and form of section are also taken up. In the conclusion it is stated that the general or collective method of treating mechanical springs should eliminate much of the complexity and diversity of the subject. The paper was illustrated by slides.

Effects of Inaccurate Spacing of Gear Teeth

"The Effect of Inaccuracy of Spacing on the Strength of Gear Teeth," a paper by L. J. Franklin, draftsman, San Bernardino Ice & Precooling Plant, San Bernardino, Cal., and C. H. Smith, instructor in mechanical engineering, Leland Stanford University, presented by the latter at the machine-shop practice session, brought out active discussion.

This paper grew out of one presented before the society in 1912 by Prof. G. H. Marx, which reported results of an extended series of tests to determine the strength of gear teeth at pitch velocities from 0 to 500 ft. per min. In the discussion of Professor Marx's paper further tests to obtain definite data as to the effect of inaccuracy of spacing on the strength of the teeth at high speeds were suggested. The authors of the paper have undertaken such a series of tests and the results obtained and a description of the apparatus used are given in the paper.

The authors found that, in a broad way, at pitch velocities of 1000 ft. per min. and upward, gears whose inaccuracy of spacing do not exceed 0.001 in. will carry twice the load of those having inaccuracies of spacing of 0.006 in. It was also said that the strength of gears having inaccuracies of spacing of the order of 0.002 in. is about half way between the two. Among those discussing the paper were H. J. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J.; R. E. Flanders, Jones & Lamson Machine Co., Springfield, Vt.;

Wilfred Lewis, president Tabor Mfg. Co., Philadelphia, and B. H. Blood, Hartford.

End Measuring Machine of High Accuracy

A paper outlining a method of producing line standards free from measurable error by the application of light interference, and describing the machine by which the line measurements are transferred to end measurements and used in inspecting gages, etc., was read by Herbert B. Lewis, Brown & Sharpe Mfg. Co., Providence, at the machine-shop practice session. C. G. Peters, Bureau of Standards, Washington, was joint author of the paper, which was illustrated by slides, and was received with evident interest.

The high accuracy and the large range in size of pieces that may be quickly inspected are features of the end measuring machine described, which is used by the Brown & Sharpe company in its small tools department and to furnish the standard for the plant. The machines are required to measure objects which vary in size from a fraction of an inch to 6 or 7 in. Since the measurements must be correct to within a very few hundred thousandths of an inch, the machine must be extremely rigid, the measuring head sensitive and the line standard free from measurable errors as mentioned above.

The base of the machine is a cast-iron box section 16 in. deep, with side walls 1 in. thick. The top surfaces are scraped to provide a support and guide for those parts in which the measuring elements are contained. A sliding element at the right contains a 40-pitch measuring screw, upon one end of which a wheel having 250 graduations on its rim is mounted. This makes each interval on the wheel rim indicate a change in position of the measuring point of 0.0001 in. along the axis of the machine. The fifth decimal place is indicated by a vernier plate over which a magnifying glass is mounted to facilitate reading. The measuring point of this element is on the opposite end of the screw from the wheel. The elimination of dependence on a screw for the accuracy of the measurement is accomplished by subdividing the first inch interval of the line standard into 40 intervals, which makes it necessary to use only half a revolution of the screw as a maximum. This half turn was said to give linear values which are accurate to within 0.00001 in.

The mounting of the microscope unit and the line standard were described in detail. A line standard was required having errors in any interval so small that they could not be detected by a micrometer microscope. The line standard had to be produced from permanent material, the lines had to be straight-edged within 0.000001 in. and the distance between any two lines had to be correct to less than 0.00001 in. The line standard was made of machinery steel. Inserts of stellite 0.125 in. in diameter were placed 1 in. apart after the first 1-in. interval, and contain lines which divide the standard into 1-in. intervals. At the first inch a stellite plug was inserted parallel to the axis of the standard to provide a surface upon which to subdivide this inch into 40 intervals of 0.025 in.

Twelve of the line standard blanks were made, and during the time that they were undergoing the aging process (which was over a period of several months) the method by which the lines were to be ruled were determined. To place the lines on the standard, some application of the method of interference of light was chosen, and the Michelson type of interferometer used. The blanks were then lined at the Bureau of Standards, the method of lining the blanks being outlined at length in the paper.

Changes in Shop Practice Division Committee

C. L. Bausch, superintendent Bausch & Lomb Optical Co., Rochester; L. B. Easton, works manager, Laidlaw Works, Worthington Pump & Machinery Corporation, Cincinnati, and E. S. Patch, General Motors Research Corporation, Dayton, Ohio, are new members of the committee of the machine shop practice division. They were appointed in place of G. E. Greenleaf, Niles-Bement-Pond Co., Plainfield, N. J.; F. O. Hoagland, Boston, and C. R. Gabriel, E. W. Bliss Co., Brooklyn, N. Y., retiring members. A. J. Baker, Willys-Overland

Co., Toledo, continues on the committee, and J. A. Smith, general superintendent, General Electric Co., Schenectady, remains as chairman.

Gives Data on Strength of Wheel Centers

An approximate analysis of the strength of wheel centers, particularly as applied to spoke wheels subjected to heavy lateral loads, such as locomotive driving wheels, was made by R. Eksergian, engineer, Baldwin Locomotive Works, Philadelphia. The title of Mr. Eksergian's paper, which was presented at a general session, was "The Strength and Proportions of Wheels, Wheel Centers and Hubs." To generalize the work, the subject is extended to a study of other types of wheels with a view to approximating their strength characteristics. Inertia loadings and proportions of flywheels were considered briefly.

A description of the Prosser reciprocating steam engine and the results of 53 trials made of it at the Purdue University were given in a paper by L. V. Ludy, professor of experimental engineering, Purdue University, Lafayette, Ind., at the same session. Another paper at this session was on "The Turbine Designers' Wind Tunnel," by H. Loring Wirt, turbine engineering department, General Electric Co., Schenectady.

Management Methods Discussed

Two papers of outstanding interest were presented at a session on management and machine shop-practice, which was held under the joint auspices of the management and machine-shop practice divisions of the society and the Taylor Society. Richard A. Feiss, president Taylor Society, presided.

The most efficient type of production management was said by George D. Babcock, manufacturing executive, Holt Mfg. Co., Peoria, Ill., to be based upon an application of the principles first laid down by F. W. Taylor in 1903 in his classic paper on "Shop Management." Mr. Babcock's paper was on "Production Control," and was presented also at the International Management Congress, held at Prague, July 20 to 24. The function of planning was stated to include all of the elements that are beyond the control of the workmen (such as quality and supply of raw material, equipment, etc.) and some of those that formerly were regarded as within their sphere. It includes a decision as to the material and the exact equipment that shall be used, the method of handling this equipment, the sequence of individual operations on each part of the product, and in the highest development of managerial science, the time that shall be taken for each operation. It also includes provision for instructing the workmen in the methods of handling the equipment so as to assure that the performance of the workman will accord with the forecast of the planning department. Upon the degree to which an industrial establishment has developed and made use of these elements of planning was said to depend the efficiency of production.

A classification of manufacturing effort was given. Irrespective of the class or combination of classes into which the work of a manufacturing plant falls the efficiency of its operation was emphasized as depending on the efficiency in selection and use of mechanical equipment and the definite preplanning of every operation and event which takes place in the progress of the work through the factory. In discussing the mechanical equipment it was emphasized that the efficiency of the plant depends upon the efficiency with which the equipment is operated. Efficient operation, in turn, depends on maintenance of equipment in perfect operating condition; adequate power at the machine; proper adjustment of machines and auxiliary equipment and properly formed cutting tools; determination of best methods of operating the equipment and insistence that these methods be followed; adequate supply of material, and uniformity in quality of raw material, permitting uniform operation at a predetermined rate.

Preplanning a Factor in Production

With the equipment in first-class operating condition, and a routine set up that will maintain it in this condition, efficiency of production will then depend upon the degree to which preplanning has been carried

out. Preplanning comprises the establishment of a definite manufacturing program; the purchase of material and the insurance of its delivery in ample time to carry out this program, and the determination of the methods to be used in carrying out the program. Other factors were stated to be: The sequence of operations to be performed on each component part of the final product (routing); the establishment of definite schedules to fix the time at which each operation in the routing shall take place; and the dispatching of the work according to the schedule.

The establishment of manufacturing programs, determination of lot sizes; establishment of the production schedule, operation analysis; stores systems, dispatching of work, inspection and maintenance are outlined clearly in the paper. In a paragraph on forms it was pointed out that to carry out the routine of any system of management certain forms are necessary. It was emphasized, however, that the system of forms should not be confused with the system of management.

In the discussion which followed Mr. Babcock's paper R. T. Kent stated that preplanning is the foundation of all good industrial management. He said that it was not merely the function of production and manufacture but it is a function of the business. Mr. Kent said that the Peoria plant of the Holt Mfg. Co. is an answer to all statements that scientific management will not work. At that plant, where Mr. Babcock is manufacturing executive, schedules have been met continuously and the product has been coming in serial to the assembly floor as preplanned for more than 760 days. This was emphasized by Mr. Kent as representing the planning and scheduling of upward of eight million operations, which record he said probably has never been equalled.

Methods Explained by Machine-Tool Builder

The second paper at this session, contributed by Ralph E. Flanders, manager Jones & Lamson Machine Co., Springfield, Vt., dealt with the "Design, Manufacture and Production Control of a Standard Machine."

The paper describes the methods by which difficulties in manufacture and production control were avoided by the author's company. The company having passed through a period of increasing speeds and feeds, improvements in methods of doing work and controlling it, with satisfactory results as to total machining time and direct labor cost, directed its attention to overhead. The latter item had suffered a considerable increase due to foreman, clerical work, cost and production offices necessary for the methods which had been adopted.

Reorganization commenced with a segregation of the products in manufacture so that separate manufacturing organizations and equipments were provided for each product, the Hartness flat turret lathe, the Fay automatic lathe, and the Hartness automatic opening die. A fourth organization was established for repair and special work. A redesign of the product was then undertaken to eliminate as many parts as possible and to standardize parts to fit several types of machines. The shop was arranged on a basis of departments by products. The turret-lathe shop and the chief manufacturing processes involved are outlined in the paper.

The routing and stock room control are also described. Each order is nominally for two months' production. Rough- and finished-parts stock rooms are kept supplied with half-lots in reserve to prevent hold up in production, but there is no stockkeeper assigned to them. Standard routing is made up from previous experience reckoning on 80 per cent theoretical machine capacity. With bi-monthly starting dates, both rough and finished stock are counted six times a year, and adjustments of volume of production are easily made.

Under the present system the foreman has full power within his territory and can measure the efficiency of his department by the schedule of hours for a given rate of output. As explained by Mr. Flanders in the discussion of his paper, the foreman is a constitutional monarch working under the laws of the realm, and is not a dictator. There was said to be little need

for cost accounting, cost of machines being determined on overall operation of the shop, costs of material, labor, overhead and fixed charges being divided by output. An hourly rate basis is used for wage payment.

The standardization of product was stressed by Mr. Flanders as the first step necessary in production control. A separate manufacturing equipment and organization for the product was another principle enunciated, as well as departmentalization by product rather than by process. The latter is the plan of the high-production automobile shop and the novelty lies in adapting it to a low scale production, in the case of the Jones & Lamson company to an extreme low point of 15 per month. A recurrent production schedule or program was emphasized as permitting the adaptation to small production, and also makes possible the measurement of efficiency and the simplification in control and cost accounting. Another principle stressed was concentration of plant. A sixth principle involved is minimized transportation and another relates to disturbing and difficult factors confined to purchasing.

Visual control of the work itself, instead of remote control by records, is a principle of the company's methods. The distance from the raw material to the finished machine is less than 100 ft. and within this short distance the work is to be found, except while being heat treated, the foreman having it under his eye until it is assembled. Control by orders instead of by records is practised. Automatic control of inventories was stressed as important, it being stated that it is a common error to put into inventory resources which belong in dividends. Cost figures obtained by analyzing total rather than by totaling innumerable details was stated as a principle also, and stressed as cheaper and surer. A plain job is given to every man and full responsibility with it. Avoiding difficulties rather than trying to overcome them was a final principle enunciated.

Mr. Flanders touched only on salient points of his paper, which was available before the meeting, and includes numerous illustrations. The paper was not offered as a panacea for all types of business, although the methods were said to apply to a large range of manufacture, particularly the machinery industries.

Storage of Fuel Oil in Industrial Plants

The storage and handling of fuel oil in industrial plants was discussed in a paper bearing that title at a session under the auspices of the materials handling division. The paper was prepared jointly by C. G. Sheffield, fuel oil department, Standard Oil Co. of New Jersey, and H. H. Fleming, refinery engineer, of the same company.

The storing and handling equipment was stressed as an important part of the oil-burning installation, and to depend somewhat on the nature of the fuel oil used. Cylindrical steel storage tanks, used vertically except for small sizes, and with conical or dome roofs were said to be in general most satisfactory. Underground storage was stated to have the advantage of low fire hazard but otherwise to have little to recommend it. Sufficient storage capacity should be provided so that during the period of greatest consumption the tanks will not be emptied between deliveries. It is always preferable to have the storage divided into two tanks, in order that one tank may be repaired or cleaned while the other is in service. This also permits of accurate gaging and in case of fire, oil from the burning tank usually can be pumped to the other. Tanks should be placed so that lines both from the source of supply and to the burners will be as short as possible. Information was given on the foundations, the construction of steel tanks, and the handling and heating of the oil.

The need of conservation of our oil resources was stressed in a lecture on the subject of "Engineers and the American Petroleum Situation," by Dr. Julian D. Sears, administrative geologist, U. S. Geological Survey, given before the fuels division. Dr. Sears reviewed the development of the oil industry and outlined some of its difficulties and hazards, as well as the methods of stabilization attempted. He stated that there can

be no reasonable doubt that as a whole the country's need for petroleum will continue to mount steadily in the future as in the past. The exhaustion of our domestic oil supply was seen as a problem which the coming generation must face. Predictions of shortage were based partly upon the inefficiency of present methods of production and use. Ways in which engineers could aid in the effective utilization of our supplies were suggested.

Papers on Oil Engines and Gas Turbines

Of major interest was a session on oil and gas power, presided over by Elmer A. Sperry, Sperry Gyroscope Co., Brooklyn, N. Y.

A feature was a paper on "Large Oil Engines, with Special Reference to the Double-Acting Two-Cycle Type," which was contributed by Charles E. Lucke, professor mechanical engineering, Columbia University, New York. The paper is an extensive review of the work done in the development of large oil engines. A report on experiments and developments during the last two years in connection with a four-stroke cycle, three-cylinder, heavy-oil engine of the solid injection type was given by R. Hilderbrand, chief engineer Diesel division, Fulton Iron Works, St. Louis, in a paper under the title "Solid-Injection Oil Engines."

A statement of the brake thermal efficiencies that may be obtained from gas turbines of various types is included in a paper on "Gas Turbines" by Lionel S. Marks, professor of mechanical engineering, Harvard University, and M. Danilov, General Electric Co., Lynn, Mass. The paper includes also a discussion of the possibilities and limitations of these types of heat engines.

Session Devoted to Steam Power

A review of recent applications of powdered coal to steam boilers was given by Henry Kreisinger, re-

search engineer, Combustion Engineering Corporation, at a session devoted to steam power. A paper on the "Recent Developments in the Burning of Anthracite Coal," by W. A. Shoudy, Adirondack Power & Light Corporation, Schenectady, and R. C. Denny, Combustion Engineering Corporation, New York, was another contribution to this meeting. Other papers included one by R. E. Hall, U. S. Bureau of Mines, on "Water Treatment for Continuous Steam Production," and another on the "Increase in Thermal Efficiency Due to Resuperheating in Steam Turbines," by W. E. Blowney and L. B. Warren, turbine engineering department, General Electric Co., Schenectady.

A paper on the Zoelly turbine-driven locomotive, by H. Zoelly, Escher Wyss & Co., Zurich, Switzerland, designer of the locomotive bearing his name, was a feature of a meeting held under the auspices of the railroad division.

The gear testing machine designed by Wilfred Lewis, president Tabor Mfg. Co., Philadelphia, for determining the effect of varying degrees of tooth accuracy and varying velocities on the strength of gear teeth, was demonstrated during the four days of the meeting. The machine was completed recently by the Bilgram Machine Works, Philadelphia, for the A. S. M. E. special research committee on gears. It will be shipped to the Massachusetts Institute of Technology, where the first series of tests of far-reaching importance will be made.

An excursion was planned for each day. These included a trip to Lakehurst, N. J., to inspect the engineering features of the dirigibles, Los Angeles (ZR-3) and the Shenandoah. Two power stations in the vicinity of New York were visited, and an inspection made of the oil-engine-driven electric locomotive developed by the General Electric and Ingersoll-Rand companies.

HIGHER RATES REFUSED

Interstate Commerce Commission Renders Decision on Bar Iron and Scrap

WASHINGTON, Dec. 9.—Proposed increases in rates on bar iron and scrap iron from Newark, N. J., and group points to New England points were denied in a decision announced last Saturday by the Interstate Commerce Commission. Suspended schedules carrying the higher rates were accordingly ordered canceled. They were filed to become effective Aug. 20, 1924, and called for higher rates in carloads and less-than-carloads by the railroads under the claim that the adjustment proposed would merely restore the relationships which existed in rates on bar iron and scrap material between Newark and Philadelphia groups and in New England prior to the various general percentage changes beginning with the 5 per cent increase in 1915. It was also stated by the carriers that the specific differences between the proposed rates from the Newark group and the concurrent Philadelphia rates are exactly the differences in cents between the rates established from the Newark group following the commission's decision in the Pardee Works case and those then in effect from the Philadelphia group. Protestants insisted that the Newark group rates have maintained their percentage relationship to the Philadelphia basis since the Pardee case and that the proposed rates, if made effective, would disturb that relationship with the result that on less-than-carload traffic, for example, the difference would be reduced from approximately 12.5 per cent to about 6 per cent. It was also urged that because of keen competitive conditions the proposed rates would have a detrimental effect upon business of the protestants, a considerable portion of which moves in less-than-carload lots, and that no changes should be made at the present time in view of the pending eastern class rate investigation, as in all probability commodity rates will be affected by any order in that case.

Indicative of the present and proposed rates are

those from Newark to Boston. The present carload rate on bar iron is 24c. per 100 lb., and the proposed rate was 24.5c., while on less-than-carload lots, the present rate is 27c., which it was proposed to increase to 29c. The present carload rate on scrap iron is \$4.16 per gross ton, while the proposed rate was \$4.21. The Philadelphia rates, which were left unchanged in the proposed tariffs, are 25.5c. and 31c. per 100 lb., respectively, on carlots and less-than-carlots on bar iron to Boston, while the scrap rate is \$4.41.

In its conclusion the commission plainly says that if the former relationship is desired it can be done by reducing the Philadelphia group rates.

"There is no evidence that the rates from the Newark group are subnormal as compared with the rates from other groups," says the decision, "and the former relationship, if desired by respondents, could be readily restored by reducing the rates from the Philadelphia group instead of increasing the rates from the Newark group. We are of the opinion that respondents have failed to sustain the burden of proof."

New York Steel Treathers to Discuss Railroad Steel

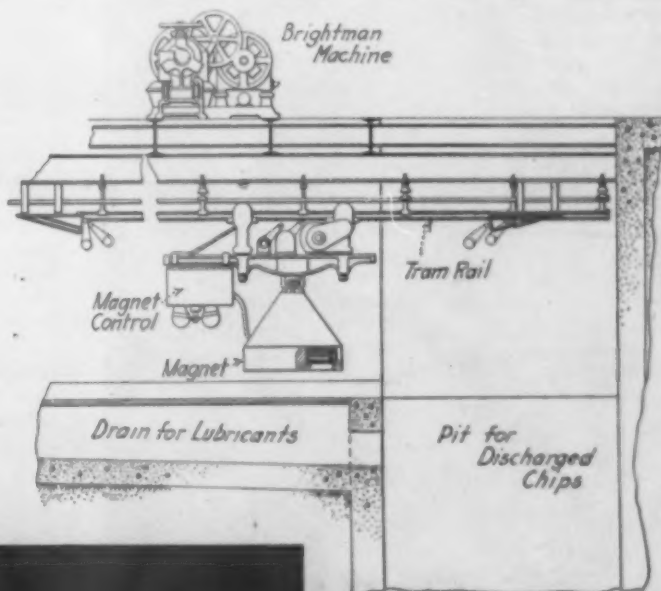
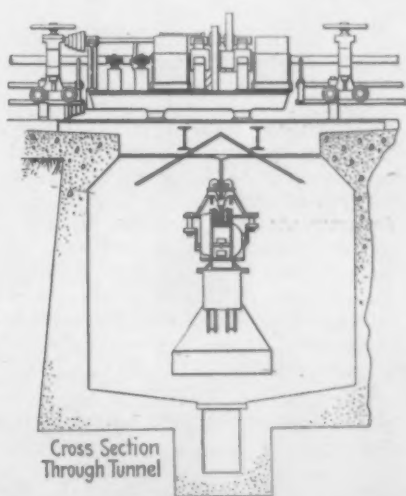
A rather unique and interesting meeting of the New York Chapter of the American Society for Steel Treating is scheduled for Wednesday evening, Dec. 17. The general subject of steel for railroads will be discussed by three authorities in the field. Lawford H. Fry, metallurgical engineer, Standard Steel Works, Burnham, Pa., will speak on the steel for rolling stock, particularly locomotives and cars, and C. B. Bronson of the technical staff of the New York Central Railroad will discuss steel used in permanent way, particularly rails and bridges. James E. Howard, engineer-physicist, Interstate Commerce Commission, Washington, will give a general summary of the subject and will contribute some special information. The speakers will each consume about 30 minutes, and will not confine themselves to the heat-treatment phase of the subject.

Using Briquetted Chips as Furnace Scrap

Compressed Material Turned Out by a Machine of $6\frac{1}{2}$
Tons Capacity Per Hour—Method of
Gathering the Chips

IN THE IRON AGE of last week were described the new steel plant additions of the Timken Roller Bearing Co., Canton, Ohio. The following paragraphs deal with the method of gathering, briquetting and handling the large quantity of small chips produced by the several machining processes employed.

Two horizontal units lying side by side constitute the briquetting machine, one motor of 75 hp. driving both units through a crankshaft, each stroke of the machine making one briquette. The scrap is dumped into a hopper and automatically raked downward into a magazine, where it is subjected to a pressure of 350



(Above) Sections Showing How Chips From the Brightman Machine, Installed Above the Chip Tunnel, Are Picked up by Magnet and Discharged into the Pit, Whence They Are Blown to the Briquetting Department

(At Left) Light Scrap, Mostly Turnings, Is Compressed into Briquettes on a Briquetting Machine at the Left, Located Below the Mill Floor and Concealed by the Woodwork. The briquettes pass from the machine up the conveyor to the top of a vertical furnace, where the oil that still remains in the briquettes is burned off, this oil supplying the necessary fuel. From the furnace the briquettes are discharged to the scrap pile at the right

Turnings and borings from the bearing factory and tube mill, being unfit for electric furnace consumption due to the bulk and low specific weight, were up to two years ago sold in the market. Now a briquetting machine compresses this material into a cylindrical briquette 7 in. in diameter and 4 to 5 in. thick, having a density of 70 per cent of the solid. The hourly production of this machine is $6\frac{1}{2}$ net tons. The turnings are mostly trucked to the machine from the different shops but in the near future a complete suction system for conveying them will be installed.

tons, exerted by a plunger. Under this pressure the oil or cutting compound adhering to the turnings is squeezed out, flowing into a container from which it is pumped back to the bearing factory and re-used, after cleansing and reconditioning. An ingenious auxiliary device allows the plunger as well as the magazine to yield, in case a bulky piece of steel finds its way by accident into the magazine.

After being ejected from the machine, the briquettes drop onto a conveyor which carries them to the top of a vertical furnace, in which they are specially

treated for electric furnace consumption. These briquettes, in addition to the crop ends accumulated from the various processes through which the ingot passes into blooms, rounds, squares, piercing rounds and merchant bars, constitute a grade of scrap which, for cleanliness and desirability for electric furnace melting, cannot be excelled. The briquetting machine, scrap pile and electric furnaces are all housed in one building which is 80 ft. wide and about 500 ft. long, making operation very simple.

Unique Method for Handling Chips

A unique method is provided for handling the great bulk of chips produced on the Brightman turning machines, which amounts to approximately 27 tons in 24 hr.



Chips Produced on the Tube-Turning Lathes Drop Into a Tunnel in Which a Magnet Operates on a Monorail. The magnet conveyor carries the turnings to the chute, from which they are blown 360 ft. through a pipe to the storage pile at the briquetting machine

The ten machines are placed in line, being spaced so as to allow for storage of rough and finished stock, and straddle a tunnel in the center of which runs an electric monorail trolley from which a magnet is suspended. The chips and cutting compound drop into the tunnel, the former collecting on the floor and the compound running off into a drain. The trolley with magnet runs back and forth through the length of the tunnel, automatically reversing itself at each end. Traveling forward, the magnet is energized and picks up the accumulated chips from the floor. Arriving at the end of the tunnel, the current is automatically momentarily reversed, dropping the chips into a chute. On its return trip to the opposite end of the tunnel the magnet is neutral.

The chips drop out of the chute into the path of a strong air current produced by a fan and are blown through a 12-in. pipe 360 ft. long to the storage pile at the briquetting machine. The cutting compound runs into a pit underneath the chute and is recirculated

to the turning machines. This chip-handling installation is taken care of by one laborer and has resulted in a saving of eight men per shift. In addition, it made available floor space otherwise lost and proved a simple and effective solution of a serious problem. All transfer trucks, tube trucks and wire trucks are equipped with Timken bearings.

National Tube Co. Operating at High Rate at Lorain

LORAIN, OHIO, Dec. 8.—Although the average percentage of operations will be slightly lower this week than last at the Lorain plant of the National Tube Co., the decrease is apparent in only two departments. All other departments show an increase or remain at present rate of production.

For several weeks the Lorain plant has been working from 10 to 15 per cent above the average for operations of Steel Corporation plants. For the week ending Nov. 29 the plant operated at 90 per cent of capacity, the highest point in a year. This week a cut of 2 per cent will be noted.

The two departments which will reduce their schedule are the open-hearth and the rail mills. The open-hearth which has been working at capacity will drop to 92 per cent, while the rail mills, which have been working spasmodically for weeks, will drop from 83 to 41 per cent of capacity.

Four departments will continue at capacity, coke plant, Bessemer blooming mills and butt mills. The blast furnace schedule of 80 per cent will be sustained. The lapweld and the rolling mills will jump from 62 to 86 per cent and 81 to 93 per cent respectively.

The Lorain plant of the National Tube Co. employs 12,000 men.

Pawling & Harnischfeger Co. Changes Its Name

The Pawling & Harnischfeger Co., Milwaukee, manufacturer of electric traveling cranes, excavating machinery, contractors' equipment and machine tools, has changed its name to the Harnischfeger Corporation. At the same time articles were amended to increase the authorized capitalization from \$3,000,000 to \$6,000,000, of which \$4,000,000 is common and \$2,000,000 preferred stock. The company has just observed the fortieth anniversary of its establishment. It was on Nov. 28, 1884, that the late Alonzo Pawling and Henry Harnischfeger opened a small machine shop which has been developed into the largest electric crane works in the world. Mr. Pawling disposed of his interests some time before his death, about ten years ago. Officers of the corporation are: Henry Harnischfeger, president and treasurer; Arthur G. Henricks, vice-president and general manager; Walter Harnischfeger, vice-president; Rene von Schleinitz, secretary.

Detroit Foundrymen at Ann Arbor

The Detroit Foundrymen's Association will hold its December meeting today at the University of Michigan, Ann Arbor, Mich., where it will visit the foundry department of that institution. Of particular interest to the visiting foundrymen is an X-ray machine used for looking through cast metals. At the association's first meeting in 1925 at Detroit on Jan. 15 the speaker of the evening will be Frederick K. Vial, chief engineer, Griffin Wheel Co., and consulting engineer, Association of Manufacturers of Chilled Car Wheels, who will discuss "Mechanical versus Hand Molding."

Sulphuric, nitric and mixed acids produced in the United States in 1923 amounted to 4,409,292 tons of sulphuric acid valued at \$38,345,925, with 21,769 tons of nitric acid valued at \$2,741,414, and 77,933 tons of mixed sulphuric and nitric acids valued at \$5,502,735. In addition, 2,209,455 tons of sulphuric acid, 87,606 tons of nitric acid and 78,535 tons of mixed acids were consumed in the establishments in which they were made, and hence did not enter into commerce.

Visual Control in Management Discussed

Extended Exposition of New Mechanism Presented at
Taylor Society Meeting—Papers on Industrial
Psychology and Market Analysis

SESSIONS on the visualization of management control, industrial psychology, sales management and two sessions for teaching of management made up in part the program of a meeting of the Taylor Society, held at the Engineering Societies Building, New York, Dec. 4 to 6. Joint sessions with the American Society of Mechanical Engineers were held Dec. 4, as noted elsewhere in this issue. There was also a special session arranged by the younger members of the society. Good attendance marked the meeting as a whole and there was considerable discussion of the papers presented.

Percy S. Brown, Corona Typewriter Co., Inc., Groton, N. Y., is the new president. Howard Coonley, Walworth Mfg. Co., Boston, and Henry P. Kendall, Boston, were elected to serve as vice presidents, and Edward W. Clark, 3d, E. W. Clark & Co., Philadelphia, is treasurer. Nathaniel G. Burleigh, Amos Tuck School, Dartmouth College, Hanover, N. H., and C. Leslie Barnum, New York, are new members of the board of directors.

An outstanding contribution to the meeting was the presentation of a new management mechanism by John H. Williams, consulting engineer, New York, in an address on "The Need, Origin and Nature of Visual Control." Following Mr. Williams, C. L. Barnum, consulting engineer, Pleasantville, N. J., in a paper on "The Mechanism of Visual Control," explained in detail the working of such control. Mr. Barnum's paper, which was interestingly presented, included cases and examples and was illustrated by numerous slides. The technique presented was said to have been developed over a period of ten years and to have been applied to large and small organizations, and organizations of diverse character.

The same principles that are applied in visualizing mechanical engineering were said by Mr. Williams to be applicable in management engineering. The architect, or engineer, before work on a structure is begun lays out on paper in minute detail the elevation, floor plans, structural details, etc. The function and relations of every member is indicated and must be correct in its relations to the whole and to all other members. Such visualization was pointed out as serving three purposes: First, that the members will serve their purpose precisely and that they are designed correctly; second, as working instructions during construction; and third, as information on which to base later modifications and additions.

It was held that the size of modern industrial plants makes similar visualization of managerial procedure essential. It was also said that such visualization serves the three primary purposes served by the engineers' blue prints, and more particularly the third purpose, inasmuch as changing conditions are continually forcing modifications in or additions to the original design of the managerial structure.

Purpose of Visual Control

The purpose of the visual control, as stated by Mr. Barnum, is to provide a standardized technique through which the functions of management may be segregated into units small enough and sufficiently complete to be easily and separately dealt with, yet so related as to show the effect of changes made within each upon all the others. Visualization of management, or of method in reference to management, he said, has to do with the "record," the "record" in management visualization being analogous to shape in drawing. There is nothing in the conduct of any business that cannot be referred to or in some way is not recorded, or has some connection with a record. If all management determinations are viewed with reference to the procedure in connection

with the records concerned, there is a definite basis, he said, for visualizing the relation of each detail of procedure to every other detail.

The mechanism of visualizing control includes two parts, a set of written instructions and a correlation chart. Instructions or standing orders are written to a function or desk and only have to do with a particular part of the procedure, a sub-heading of the whole or so-called project analysis. Each instruction is short, deals with one detail of procedure only, but is capable of being combined with other instructions to obtain continuity of procedure, duties of any function, procedure under any set of circumstances and procedure affecting any department.

The correlation chart is the assembled drawing. Through it is visualized the relation of each part with the other. It makes duplication impossible and prevents any omissions. It relates the procedure of all records to one another, to the responsible function and is a superindex. While mnemonic symbols are used, it is simple and as easy to read as a drawing. In instruction writing the classification of matter and language used is the unique feature of the instructions. There is a classification under standard titles or headings and in addition the body matter is written in these margins. The first margin contains specific directions to the desk, the second margin contains supplementary or alternative instruction and the third contains information. It is possible to read down the left margin to obtain continuity of procedure and unnecessary to read alternative or explanatory matter except when further amplification is required. Each instruction is complete within itself, there are no cross references. The direction is written in the first person imperative, the thought of a sentence is usually indicated in the first few words.

The mechanism may be employed in several ways. The visualization may be used for entirely new procedure, in the check up of old procedure and in part to trace through the effect of changes. Its flexibility is a feature.

Addresses By Psychologists

"The idea of a special psychology of industry must be abandoned," said Elton Mayo, industrial research department, Wharton School, University of Pennsylvania, in his address at the session on industrial psychology. "What is wanted," he said, "is a coordinated study of human nature and human behavior, a single technique or method of investigation capable of an infinite diversity of applications in factory, school and clinic."

The two general forms of psychology in the field, the academic, which has been developed mainly in universities, and the medical, which has been developed in psychopathological clinics and hospitals, were briefly described. In respect to logical and scientific method, the advantage was said to rest with the academic; in respect to the area of fact surveyed, the advantage rests with the medical.

The responses of every individual to the associations and opportunities of the factory or office were stated to be, for the most part, determined by causes in his personal history and total situation which lie beyond the immediate control of the management. If the personnel manager or industrial psychologist be trained to take account of this situation dealing with an individual, it will involve no more work than at present and the work will be infinitely more effective.

Modern methods of industrial organization were stressed as imposing on the average individual long periods of revery thinking. Machine operation, once

the worker is habituated to it, does not demand a high degree of concentrated thought. On the other hand, it is impossible for him to concentrate his mind upon anything else. One finds in actual practice, it was stated, that the mental mood therefore which accompanies work is very frequently a low grade revery of a pessimistic order. The danger of this general condition was indicated to lie in the fact that adult nervous breakdown originates in earlier pessimistic reveries. It was said that so far as this general state of affairs exists and remains uncontrolled we may expect an increasing condition of emotional unrest.

Another reason why psychological investigation is necessary to industry was said to be that these pessimistic reveries which culminate in disorder and unrest (absenteeism, high labor turnover, strikes) are relatively easily controlled, provided that the management has a means of discovering the nature of the cause. The usual form which pessimistic revery takes in the factory is that of depressed reflection upon personal and intimate affairs. It is important for management, said Mr. Mayo, to realize that the conditions of work or occupation can exaggerate or minimize this tendency.

In outlining these reasons for psychological investigation, Dr. Mayo said that he had been discussing the vexed question of monotony and boredom as distinguished from physiological fatigue. Monotony in itself is, apparently a matter of no great moment, he said; the definition of what constitutes monotony will, in fact, be found to vary with every individual. Monotony becomes a problem for the management of a concern when it is obviously giving rise to pessimistic revery, not merely in individuals but over wide areas of the personnel.

Reference is made in the paper to the psychologists' method of approaching the individual and to the content of the pessimistic reveries in particular cases. Instances of investigations are given. In conclusion it was stated that the sources of unrest are not all within the factory, but the method of handling its workers adopted by the factory will determine whether conditions of occupation will exaggerate or diminish personal discontent.

An address by W. V. Bingham, director Personnel Research Federation, was on the subject of "What Industrial Psychology Asks of Management." Psychologists were said to have four things to ask: patience, discrimination, research opportunities and reliable criteria.

Scientific Management Will Increase Wages

That scientific management of industry when extensively adopted will double the real wage of labor was prophesied in an address by Prof. Irving Fisher, Yale University. In the end, said Dr. Fisher, labor gains the most from so-called "labor-saving devices."

Increased production means simply increased income to society and the wage earner usually profits the most in the end. Scientific management which makes more shoes and clothes decreases the real cost of shoes and clothes to us all. Real wages consists of shoes and clothes and house shelter and food and the other things which labor consumes. Any device which facilitates their production tends to increase real wages. This seems extraordinary to those who have not followed scientific management, just as several years ago the statements of Mr. Brandeis and his witnesses seemed extraordinary when they claimed the railways of America could save a million dollars a day by scientific management. But the proof that scientific management can more than double the average productivity is afforded by experience. In one instance the production of a plant was increased through scientific management from 5,000,000 units to 17,000,000.

Just as engineering, though originating in industry, had to pass through the university to receive its highest scientific formulation and then back to industry, thousands of educated young men to become engineers, so today industry with which scientific management began needs to hand over to our universities the task of educating young men in Taylor's principles. My own university, Yale, is making a start in this direction, as have several other universities. Our progress will be slow because impeded by prejudice, ignorance and indifference, as progress ever is and must be. The worst tragedy is the opposition of so many misguided labor leaders whose philosophy is the opposite of Taylor's and who insist on limitation of output and reducing the flow of milk and honey.

"Making work" in this way reduces real wages to the average laborer. But employers before they blame labor for ignorance and prejudice should take first the beam out of their own eyes. For they have set bad examples in creating artificial scarcities and seeking "protection" from competition, to say nothing of angering labor by cutting piece rates and robbing the individual workman of the necessary incentive to increase production. Both capital and labor are injuring themselves by squabbling over distribution instead of joining in production. The distribution struggle in Russia has ended in Bolshevism, which has reduced production as startlingly as Taylor's scientific management would increase it.

A series of meetings devoted to the teaching of industrial management were well attended by members of the teaching staffs of engineering schools and schools of business administration.

An address on overcoming the obstacles in an installation, by Morris L. Cooke, consulting engineer, Philadelphia, was a feature of a special session arranged by younger members of the society.

BUST OF ADMIRAL MELVILLE

Presentation Speech to Engineers' Society Stresses His Indomitable Will and Energy

In the absence, because of sickness, of Walter M. McFarland, the presentation to the American Society of Mechanical Engineers of the bronze bust of Admiral George W. Melville was made by Dr. William F. Durand, the new president of the society, who read Mr. McFarland's prepared address and added a few words of his own, based on his service under Admiral Melville after his graduation from the Naval Academy. The address emphasized the four great features of Admiral Melville's character—will power, tenacity of purpose, absolute fearlessness and leadership. In fact, he was characterized as "one of the old vikings in a modern age."

An example of this was drawn from his action in the harbor of Bahia, Brazil, when engineer officer on the U. S. S. Wachusett. This was in 1864 when the Confederate corsair Florida was in that harbor. It was decided to ram the Florida, in spite of its being a breach of international law. Fear was expressed that this would unseat the boilers, disrupt the steam con-

nections and release live steam below decks, to the great peril of everybody there. Melville volunteered to remain alone in the engine room during the operation and, of course, the dire results expected did not materialize.

The paper traced his great services in the Arctic and his outstanding service in the design branch of the engineering department of the Navy, culminating in his period of 16 years, from 1887 to 1903, as engineer-in-chief. During this period the famous law of 1899 was passed amalgamating the engineering branch of the Navy with the line and resulting in a training of our naval officers through which they were made engineers primarily, with a certain amount of ordnance and seamanship on the side. The bust is the work of Samuel Murray, sculptor.

Responding for the society, Fred A. Low, editor of *Power* and president of the society, accepted the gift with suitable words. He stated that the addition of such a bust to the society's possessions would be an inspiration.

Calvin W. Rice, secretary of the society, laid additional emphasis on the element of devotion as exemplified by Admiral Melville and further by the work of Mr. McFarland and his committee in obtaining this bust.

Federal Commission on Pittsburgh Plus

Annual Report Says Compliance with Cease and Desist Order Should Have Important Results to the Benefit of the Public

WASHINGTON, Dec. 9.—Occupying greater space than any other of the many subjects treated, the Federal Trade Commission, in its annual report, devotes four pages to a discussion of its cease and desist order against the United States Steel Corporation in the Pittsburgh base case. This outstanding proceeding, involving action by the commission which it never before had taken, is classified and given the leading position under "Typical Orders."

While there may be sharp disagreement on the part of the trade with some of the statements made by the commission in discussing this case, it is nevertheless reviewed concisely and affords a clear background, as the commission sees it, of the entire issue in which proceedings were more protracted than any other matter that has ever been brought before that body. Among other interesting things in the report is the statement made public for the first time showing that the cost of the case was \$88,945.33. There were 28 employees engaged from time to time on it. More than 18,000 pages of testimony were taken and more than 7500 exhibits filed.

Chicago Base Abandoned

The report points out that in 1917 the War Industries Board announced prices on steel (plates, shapes and bars) f.o.b. Chicago and f.o.b. Pittsburgh, but that nine months later "through the solicitation of certain steel manufacturers, eliminated the f.o.b. Chicago prices and reinstated the f.o.b. Pittsburgh prices as to those products." The subsequent protests, hearings and formal proceedings followed by the order are set forth. The report takes up a discussion of the effects of so-called discriminatory prices under the Pittsburgh plus system and declares that it gives such subsidiaries of the Steel Corporation as the American Bridge Co., with its plants at Chicago and elsewhere, a great advantage over its competitors which had to pay Pittsburgh plus.

Effects Hoped For

In discussing what it expects to be the effect of the cease and desist order, the report says:

"A compliance with the order of the commission should tend to decentralize the steel industry and to avoid the great amount of cross freights in shipping steel from one steel center into the territory of another, which has proved so costly to the public. It should also produce other effects beneficial to the public interest, among which may be mentioned:

"First, the sale of steel at low-cost-producing centers at prices commensurate with the cost of production. The reverse of this was the condition under the Pittsburgh plus system.

"Second, the placing of the competitors of the American Bridge Co. and other like subsidiaries of the Steel Corporation which must buy their steel from others, more nearly on an equal basis with such subsidiaries.

"Third, the saving to Western and Southern steel users of the extra prices charged for steel under the Pittsburgh plus system.

"Fourth, the saving to the consuming public of much more than Pittsburgh plus, such as notably in the case of the farmers; in such case the Pittsburgh plus paid by the agricultural implement makers was reflected in the ultimate selling price of such implements to the farms by an increase of more than double the amount of Pittsburgh plus.

"Fifth, the material cutting down of the overhead expense of the Western and Southern steel users which had been occasioned by the extra prices paid by them for steel under the Pittsburgh plus system.

"Sixth, the use of waterways in shipping steel in order that Eastern steel producers may enlarge their markets by cheaper transportation. Under the Pittsburgh plus system, the Pittsburgh district steel producers were not interested in cutting down transportation charges from Pittsburgh which would have enabled them to effect a saving to the public.

Seventh, the enlargement of the territory in which the Western and Southern steel users can compete with their Pittsburgh district competitors, a territory which had been unnaturally and materially restricted under the Pittsburgh plus system.

"Eighth, the natural growth of steel-producing centers at points of low-cost production and increasing demand. Under the Pittsburgh plus system the growth of the Pittsburgh steel center had been continuously, unnaturally, and materially encouraged, while that of the Western and Southern steel centers had been likewise discouraged.

"Ninth, a compliance with the commission's order, while not of itself a preventive of restraint in price competition, should measurably encourage such competition. At the same time, it should have the effect of eliminating the burdensome discriminations in steel prices which existed under the Pittsburgh plus system."

Commissioner Gaskill Submits Separate Report

Member Who Dissented from Decision in Pittsburgh Plus Case Makes Important Recommendations

WASHINGTON, Dec. 9.—Creating mild surprise but receiving a favorable welcome from business interests of the country, Commissioner Nelson B. Gaskill of the Federal Trade Commission last Friday submitted to Congress an individual typewritten report and recommendations with reference to possible improvements in the functioning of the commission. Mr. Gaskill's separate report was made public simultaneously with the regular report of the commission. The surprise came from the statement in Mr. Gaskill's report that he had presented it to the commission but that the latter rejected it. Commissioner Gaskill took the situa-

tion in hand and of his own accord sent the report with recommendations to Congress. The report contains two recommendations looking to the expedition of the work of the commission, which has become extremely heavy, and to the lessening of "external police regulation" over business by the Government. It was pointed out by Mr. Gaskill that he has made no suggestion that the jurisdiction of the commission be broadened or defined by congressional action. The changes suggested are, he states, in procedure only, and it is believed, he adds, "are calculated to obtain the results which the law presupposes, without diminution but

more promptly, more efficiently, and at less cost than is now required."

Great Increase in Work

Commissioner Gaskill shows a practically constant increase in the work which the commission is called upon to do. This is so great, it is pointed out, that even if the commission had an appropriation large enough to maintain the forces required to do the work, it would be physically impossible for the members of the commission in one year to handle the cases which are now in arrears and incomplete, as well as those which would come to his attention during the year.

Commissioner Gaskill points out that the Bureau of the Budget has recommended a decrease in the commission's appropriations, which means that unless the commission's methods are changed it will be hopelessly in arrears in the discharge of its duties. To meet this situation, Commissioner Gaskill recommends legislation which will authorize the commission, instead of issuing a complaint in every case with its attendant process of pleading, trial and argument, wherever a respondent is willing to admit the facts charged against him and will agree to discontinue the questioned practice and will further agree that if he resumes the practice his statements may be used against him in any subsequent proceedings to dispose of the matter upon such a stipulation.

The second recommendation by Commissioner Gaskill looks to a development of self-government of business by its own members, and the consequent lessening of external police regulation. The trade practice submittal which the commission has developed has decided limitations in that the result of the trade practice submittal has no force or effect. Its use is for the purpose of showing trade opinion, and if a court can be convinced that this trade opinion is well founded the transgressor of the trade rule so established can be restrained. There are many practices, however, Mr. Gaskill says, of which business groups strongly desire to be rid, which cannot be placed by this method upon a basis which will now receive legal sanction. What Mr. Gaskill proposes is that the trade practice submittal be legalized and that the expression of the trade constitute something in the nature of a law merchant, which shall have a prima facie force, so that the burden of proof would be reversed. Instead of the commission being obliged to substantiate the trade rule so enacted before a court, the burden would be upon a transgressor to show that the rule was unjust or illegal.

It is very questionable, Commissioner Gaskill says, whether it is possible for five commissioners to dispose

of the volume of business before it at the beginning of the year 1924-25, which constitutes 564 applications for complaint and 265 formal complaints, which make a total of 829, in addition to the new year's current work. Even if the commission had at its disposal a force equal to the requirements of bringing this volume of cases to a conclusion within the fiscal year, this condition, Mr. Gaskill says, indicates the necessity for a procedural change in the commission's methods.

Long Time Required

Commissioner Gaskill reviews court decisions affecting work of the commission, delays that are occurring in proceedings, and time required in preparation of conspicuous cases, including the Pittsburgh plus proceedings, and the Bethlehem-Lackawanna case. At the present time it is said that a simple case requires from three to six months from the "request" stage to final solution, while the more complicated matters cannot be disposed of inside of nine months or a year.

Assuming that the object of the law is attained when the method of competition has been determined to be unfair and its use has been discontinued, Commissioner Gaskill states that there seems to be no reason for a mandatory requirement of a complaint, a formal trial, and a formal order to cease and desist in each and every case. He then proposes the stipulation between the commission with parties accused of unfair methods of competition, giving them an opportunity, without proceeding to cease and desist but manifestly not depriving the respondents of their right to contest the case or depriving the commission of its right to proceed in any case. The experimental period during which this plan was under way, in the opinion of Mr. Gaskill, proved highly satisfactory.

Turning to the second recommendation relating to trade practice submittal, Commissioner Gaskill says that at the present time this is a device created by the commission, "the weakness of which is indicated by its very title." It is his opinion that the trade practice submittal or conference might well be raised from its informal position to a status in which it would become the most effective means of affording relief from the use of unfair methods of competition.

Commissioner Gaskill points out that in practice whenever a group in the business world becomes itself conscious of practices of which it desires to be rid for the betterment of its operations, it applies to the commission for a conference in which the industry under the control of its own representatives attempts to crystallize and define its own concepts of the practices which constitute unfair methods of competition.

BETHLEHEM IMPROVEMENTS

President Grace Makes Statement as to Plans and Additions Completed

In a summary of plant improvements of the Bethlehem Steel Corporation, some of which have been completed, some yet in process, President Eugene G. Grace said last week that "the effect of the improvements in the plants is already noticeable in manufacturing costs, and as a result, in earnings. Bethlehem is now operating at about 70 per cent of its full capacity.

"The Bethlehem Steel Co. has completed, at the cost of \$6,000,000, the remodeling of the coke-making equipment at its Lackawanna plant. The new equipment gives Lackawanna a coke-making capacity of 100,000 tons a month which is near the maximum required to operate its blast furnaces at capacity.

"The new ovens will make coke in 12 hours as against 18 to 20 hours required in the process formerly used. They give the company the advantage of reclaiming all the by-products of coke, including fertilizer, gas, lubricating oils, tar and pigment used in the manufacture of coal tar dyes."

Improvements in plate, blooming and roughing mills at the Lackawanna plant are finished. These mills have

been completely rebuilt and equipped throughout with electric drive, and power and heating equipment have been modernized. Of projects still uncompleted, Mr. Grace said:

"The new structural mills at Lackawanna will probably be completed in the latter part of 1925.

"At Bethlehem's Cambria plant in Johnstown, the Gautier bar department is being completely remodeled. A new blooming, billet and sheet bar mill has been also completed at Cambria and is now in operation.

"The new tin plate plant at the Sparrows Point plant will be finished early in 1925. This plant will include 12 mills and will add 50 per cent to Sparrows Point's present tin plate capacity. The rail mill at Sparrows Point has been rebuilt, electrified and is now in operation."

Before alterations are completed at the acquired properties, about \$60,000,000 will have been spent, Mr. Grace believes.

The Cleveland Cliffs Iron Co., Cleveland, has placed an order with the Great Lakes Engineering Works, Detroit, for a 600-ft. ore boat for 1925 delivery. This will have a capacity of about 13,000 tons and will be the largest boat in the Cleveland-Cliffs fleet. This is the fifth large cargo carrying vessel that has been placed with lake shipyards for 1925 delivery.

Multiple-Spindle Drills Equipped with Electric Tapping Reverse

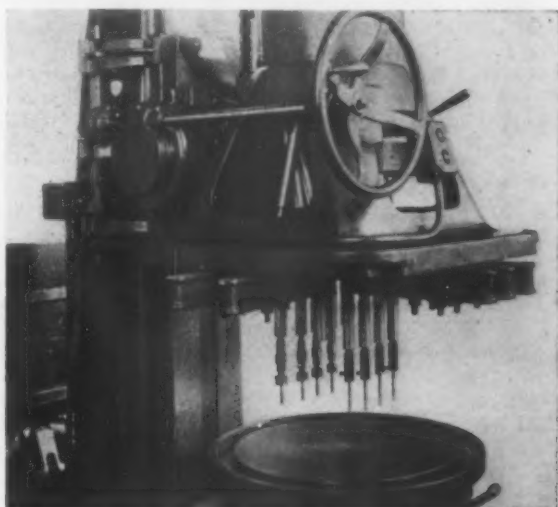
Automatic reversal of the direct-connected driving motor, for backing out taps, is a new feature of the multiple-spindle drilling machines of the Harrington Co., Seventeenth and Callowhill Streets, Philadelphia.

The machine illustrated, which is designated as the No. 51-C multiple drill, incorporates the new feature. Tapping is performed at drilling speed so that work requiring successive operations may be drilled and then tapped without removal from the work-holding fixture. The tapping control for obtaining reversal of the motor is arranged so that it does not interfere with the use of power feed for drilling. Adjustable stops in a bar attached to the head engage the double push button mounted on the column of the machine, as shown in the close-up illustration, which operates the automatic reversing controller and the motor.

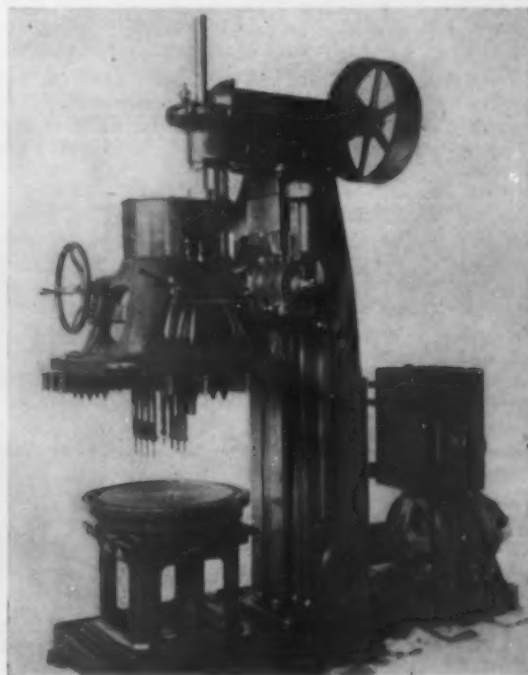
This type of reversal can be supplied for both direct and alternating-current motor drive. The reversal to

Canadian Corporation Feels Foreign Competition Keenly

TORONTO, Dec. 8.—Some of the difficulties confronting the British Empire Steel Corporation, Sydney, N. S., through lack of new business and Belgian competition were revealed by J. E. McLurg, vice-president of the corporation, at a meeting of the combined committees of the employees' representation plan. Mr. McLurg announced that the 12,000 tons of rails rolled last July took that tonnage from next year's business, as the company is carrying the rails in stock until next April at a cost of \$2,500 per month. After Jan. 1 it is hoped that the Canadian National Railways will place rail contracts. However, in view of the fact that the wage contract with the miners expires Jan. 15, it is not likely that the rail mills will resume operations, if orders are secured, until contracts have been signed. It is the company's intention, Mr. McLurg stated, to open negotiations with the new executive of the United Mine Workers as soon as possible.



Multiple-Spindle Drilling Machine with Electric Reversal for Backing Out Taps. The view above shows the bar attached to the head, which carries adjustable stops. The latter engage the double push button on the column, which operates the controller and motor



full speed in the opposite direction is said to take place in approximately 2 sec., which is sufficient for the motor to stop and accelerate in the reverse direction. The back-lash in the gearing and universal joints is taken up gradually, and the destructive shock which obtains when mechanical reversal is used is said to be eliminated. It is also found that the point of reversal can be accurately controlled, which is of particular advantage when tapping "depth" holes.

American Exports of Wire and Cable

October exports from the United States of copper wire, both bare and insulated, and insulated iron or steel wire and cable are shown in a report from the Department of Commerce. Bare copper wire shipped during the month amounted to 1,112,844 lb., valued at \$193,306. More than 60 per cent of this total was sent to the British West Indies. Mexico was second in the list, but with less than 7 per cent of the total. Insulated copper wire and cable was shipped during the month to the extent of 1,959,594 lb., valued at \$446,841. More than 60 per cent of this amount was sent to Cuba, England taking the second largest tonnage, but only 5 per cent of the total. Insulated iron or steel wire and cable was shipped during the month to the extent of 79,254 lb., valued at \$16,461. Mexico took about 23 per cent of the total and Cuba about 13 per cent. The remainder was scattered over a wide area.

In obtaining new business, other than probable contracts from the Canadian National Railways and the Canadian Pacific Railway, the company is up against European competition, particularly from Belgium. Mr. McLurg pointed out that the prices offered by Belgian and German firms on billets was from \$10 to \$12 per ton less than they could be produced for in Sydney, N. S., and that the duty on imported billets, etc. (\$2.50 per ton), was so small that it did not afford Canadian companies adequate protection against European competition; the Canadian steel worker being unable to compete with the low-paid labor of Germany and Belgium.

Central Steel Co.'s New Stack

The Central Steel Co., Massillon, Ohio, has commenced to place orders for construction work and equipment for its new 600-ton blast furnace. The plate construction work has been placed with the Ritter-Conley Co., Pittsburgh. It is expected that the electrical equipment will be purchased in the next week or two. The company is inquiring for an ore handling bridge equipped with a 10-ton bucket. The plans provide for a by-product coke oven plant, but the erection of this has been postponed. The present building program includes a large power plant, part of the equipment for which will be purchased now and the remainder units will be installed when the coke oven plant is built.

Hollow Balls Made from Strips and Tubing

Produced Without Seams, Joints or Plugs from Single Piece
of Metal—Rolling Operation, Which Follows Press
Work, Important Step in Process

HOLLOW balls, which average less than 40 per cent of the weight of solid balls of the same material and size and for which special advantages are claimed, are produced from cold rolled strips or seamless tubing by a novel process recently patented by the Hollow Ball Co., Inc., Baltimore.

At present the facilities of the company are devoted to the manufacture of hollow balls of brass, copper, monel, aluminum and other non-ferrous metals and in sizes from $\frac{1}{4}$ to $3\frac{1}{2}$ in. in diameter. In the smaller sizes the balls are made from strip metal and in the larger sizes from tubing. The wall thickness of the finished product is between 8 and 10 per cent of the diameter and uniformity in the thickness of the wall is an outstanding feature. The finished ball is held to within 0.0001 in. of the nominal diameter. Research work relating to the production of hollow balls of steel for bearing duties is in progress and it is expected that

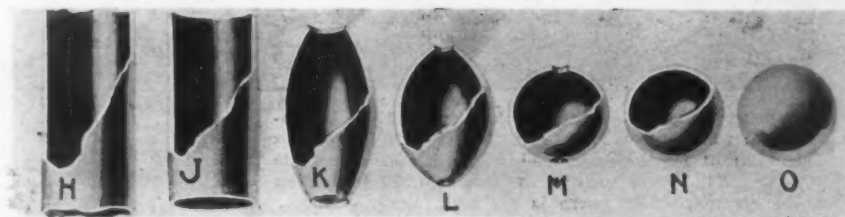
means of a belt and gearing. A fundamental feature of the disks are the matched concentric grooves of compound circular section shown in Fig. 5. Upon the accurate machining and lapping of these grooves the closing of the hole in the blank and the true sphericity of the ball depends. The machine is provided with an ingenious hopper feed, and the revolving plate has a section cut out (not shown in Fig. 5) and arranged with guiding fingers to keep the balls traveling from the inside to the outside groove.

In operating the machine the hopper is filled with the open balls such as shown at E, Fig. 1, the apertures of which are to be closed. They feed down by gravity through a flexible tube to the inner groove of the plates or disks. The balls then travel around the inner groove, are then deflected to the next outer groove and finally, upon completing the circuit, they are thrown by centrifugal force through a second flexible tube up into the



Fig. 1.—Successive Stage in Production of Hollow Balls from Strip Metal (At Left)

Fig. 2.—The Tube Is Cut to Length and the Ends Tapered. Succeeding operations are similar to those for making the balls from strips



balls of this material will be placed on the market in the near future.

The steps in the manufacture of these balls may be noted from Figs. 1 and 2. In the case of strip brass annealed material is used. In the first operation the coils are fed automatically to a press, which blanks and draws the cup as shown at A and B, Fig. 1. In the next step the cup is redrawn in presses arranged as shown in Fig. 3, after which the outer edge is trimmed in a special automatic machine equipped with hopper and dial feed. To relieve the strains set up in the press operations the blanks are then annealed in a continuous rotary gas-fired furnace, after which they are taken to a press for pointing, which leaves the blank more or less oval in shape and with an opening at one end as shown at D. Another press, which is also automatically fed, is employed to round the blanks as shown at E, this operation being followed by a second annealing.

Holes Closed by Rolling Operation

The next step, that of closing the hole, is probably the most important operation, because upon it the success of the entire process depends. A rolling machine of special design, the general arrangement of which may be noted from Fig. 4, is employed. The machine carries two removable alloy steel plates or disks mounted on separate horizontal shafts as shown. One disk revolves and the other is stationary, the revolving plate being driven from the countershaft by

hopper. This cycle of operation is repeated until the holes in the blank are closed and the balls are truly spherical to within approximately 0.001 in.

The large handwheel at the right of the machine operates a screw mechanism which exerts pressure up to 35,000 lb., the pressure varying with the number of turns of the wheel. The latter is revolved constantly by the operator and the resulting pressure on the revolving disk presses the balls against the stationary plate or disk. At the beginning of the rolling operation the balls make contact with the grooves in the plates at four points, the lineal speed of the contact at the outer edge of the grooves being greater than at the inner edge. This, it is explained, serves to give the ball a spinning motion in addition to the rolling caused by the relative motion of the two plates. There is also a third action, a gyrating motion, which is due to the increasing pressure caused by the turning of the handwheel. The object of the triple motion is to expose every point on the surface of the balls to contact with the steel plates.

As the rolling operation continues and the pressure on the balls is increased the volume of the balls is contracted, forcing the excess metal into the opening left by the previous operations until the aperture is completely closed. The rolling operation is then continued until the spinning of the ball causes an interlocking of the metal fibers adjacent to the aperture. Thus there is a mechanical knitting of the metal, the rolling process



Fig. 3.—Duplex Press with Automatic Dial Feed Employed in Re-drawing Operation. The re-drawn and trimmed blank is shown at C, Fig. 1

having a tendency to move the metal fiber from points where it is excessive to points where there is a deficiency.

Wall Uniformity a Feature

A feature is that the balls are uniformly walled throughout. This is partly attained in the press operations, but is more largely due to the strenuous action of the rolling plates. The wall uniformity is emphasized as providing inherently perfect balance, which is particularly valuable in such applications as deep well pumps, check valves, etc. With a balanced light and resilient ball the valve is more sensitive, the lighter ball responding more readily to changes in fluid pressure. Pounding is also decreased because of the reduced shock of the lighter ball, and the effect of the shock on the valve seat is considerably reduced because of the resilience of the ball. Perfect balance and lightness of the ball are emphasized as permitting the fluid to exert its whirling effect on the ball, giving all points

of the ball an equal opportunity to get in contact with the seat, thereby distributing rather than localizing the wear which would occur if the ball were unbalanced.

After being closed and rolled, the balls are ground in standard machines by being rotated against an abrasive wheel. The balls are then polished in tumbling barrels, and inspected and graded in the usual way.

In making balls from tubing the latter is cut into lengths and then the ends of the cut blanks are tapered as shown at J, Fig. 2, in automatic screw machines. In the next operation, performed by a press, the blanks are pointed or ovalled as shown at K, the larger balls having an additional ovaling operation as shown at L. The blanks are then rounded in a press as in the case of the balls made from strip metal. The closing of the apertures, in this case two, is done in rolling machines of the same type used for balls made from strip metal. The grinding, polishing and subsequent operations are the same also.

An outstanding feature of this process of ball manufacture, stressed by the company, is that each step in it is a test in itself of the ultimate fitness of the ball. In the first place the selection of material is facilitated because defects that may exist in a strip or tube are superficial, and as compared to those in a bar are more or less easily detected. Secondly, assuming that defective raw material has passed into the process of manufacture, it would be eliminated automatically during subsequent strenuous press operations, which would crush any faulty ball blank. It is emphasized also that the fact that the ball has withstood the great pressures incident to the rolling operation and comes out intact, if not improved, would be conclusive evidence that the ball is equal to the service for which it is intended.

An important claim made for the hollow ball is that it is free from internal stresses, the advantage of which in balls of the larger sizes is apparent. On this point Dr. Tobias Dantzig, research engineer of the company, may be quoted. "The field of the large ball applications has been heretofore limited because of the unrelieved internal stresses which are nearly always present in large solid balls. Large balls are being avoided in thrust bearings. The centrifugal force of the ball causes severe strain on the ball retainer, as well as general overload; that is, the centrifugal force set up when added to the normal load may exceed the rated load capacity of the ball bearing. As the centrifugal force is proportional to the weight of the ball, it is obvious that with the substitution of the hollow ball with a subsequent reduction of 65 per cent of the weight this condition will be alleviated to a considerable extent."

The Champion Spark Plug Co., Toledo, Ohio, has commenced the erection of a cold drawn steel plant with capacity of 60 tons per day.



Fig. 4.—Machine Used for Closing the Hole and Forming the Hollow Ball Fig. 5.—(Above) The Form of the Grooves in the Plate Used on the Rolling Machine Is of Basic Importance



DISCUSSION ON AERONAUTICS

Aerial Surveying, Helicopters and Designing Airplanes for Production in Quantity

Three papers on aeronautics were read Dec. 4 before the American Society of Mechanical Engineers: "Equipment Used for Aerial Surveying," by Ernest Robinson, vice-president Fairchild Aerial Camera Corporation, New York; "Introduction to the Helicopter," by Prof. Alexander Klemin, New York University; "Production Airplanes of Metal," by Capt. Edmund B. Carns, Jamaica, N. Y. This session was presided over by Dr. Sanford A. Moss of the General Electric Co.

Mr. Robinson's paper took up not only the problem of map making for military purposes, but also the making of maps for industrial use, including the laying out of power lines, the location of reservoirs and various other features primarily interesting to the civil engineer. He went into considerable detail, however, in connection with the equipment and particularly with regard to the cameras and the method of control. He described at some length the use of stereoscopic cameras and also the use of cameras with three lenses, one being mounted vertically, with the other two at an angle. It is possible by means of these devices to obtain such a graphic picture of the terrain below that contour lines (not closer together than 20 ft.) can be laid out with some precision and a great deal thus learned.

In response to a question, he stated that a strip survey of the territory from New York to Chicago (as an example) might be made at a cost of about \$25 per linear mile, the map produced having a scale of from 1200 to 2000 ft. per in. The cost, of course, would vary with the scale of the map and the height of the flight.

Helicopters

Professor Klemin outlined as the two most important things to be studied, in connection with the helicopter, the gliding property of the machine with the motor dead, and the stability essential to its safe operation. Recognizing at the start that the helicopter cannot compete with the airplane in speed or load carrying capacity, he argued that it ought not to be considered as a direct competitor with the airplane, but rather as a totally different machine.

Discussion of this paper was spirited and brought out a number of important points. So far no major commercial use has been allocated to the helicopter. It was pointed out by two speakers, however, that no major commercial use had been indicated for the airplane at the time the Wright brothers were making their experiments. The heavy driving mechanism for the two sets of driving devices—vertical and horizontal—takes up in existing designs practically the entire available load-carrying capacity.

In connection with this point, Dr. William F. Durand, the new president of the society and formerly chairman of the National Advisory Committee for Aeronautics, stated that these two sets of organisms must be independent of each other or else, in the interests of weight economy, merged into one set, of which either the one element or the other must operate at low efficiency. Sustentation and propulsion are alike required of the engines of the helicopter, whereas the airplane obtains the first quality from the lifting power of its wings when forced forward by the propulsive power of its motor. Dr. Durand paid a tribute to the author of the paper in that he has codified that which is known with regard to the science of the helicopter design and has indicated what we still have to learn. The matter of helicopters for "hovering" was active in the fall of 1917 in Washington, but was not pushed at that time because what was needed then was needed quickly and events could not wait for the long-drawn-out development of a new tool.

Much Knowledge Now Available

Prof. Edward P. Warner of the Massachusetts Institute of Technology pointed out that, in approaching the design of the helicopter, we do so with much data

available regarding air currents, propeller efficiencies, the air resistance of bodies of different forms and other valuable matter in connection with propulsion, stability, etc. Twenty years ago all of this data was lacking and the Wright brothers, in their experiments, had of necessity to create the information for themselves. He pointed out the great influence of what is known as the ground effect upon the helicopter, this being, of course, most pronounced the closer the machine is to the ground or other reflecting surface. Much greater lateral stability exists near the ground because of the fact that the thrust of the propellers meets a definite resistance.

One speaker questioned the superiority of tandem propellers over propellers side by side. It was pointed out by Professor Klemin, however, that in a pair of tandem propellers the upper unit is working in an upward current of air and, therefore, necessarily develops a higher thrust than otherwise would be possible. Multiple propellers were discussed, one speaker referring to a machine with as many as 20. This subject was one considered worthy of careful attention and it was suggested that perhaps six propellers independently operated might obviate all need for gliding with dead motors.

Production of Airplanes in Quantity

Discussion of Captain Carns' paper was both spirited and adverse. Several written discussions read by the secretary took issue with certain features of the paper. Some of these had to do with his cost figures, admittedly based on meager data. Others had to do with the character of the design he had used as the basis for his calculations, and others with questions of weight. One speaker feared that the felt used in various places to avoid necessity for close machining might become compacted and thus provide the very slackness and vibration which it was designed to avoid.

Two speakers stated that the tube section is not the section best adapted to withstand bending in one plane. In particular, a case was brought forth where two 2-in. steel tubes were made the top and bottom members of a truss 17 in. deep, where a single tube could not possibly have been substituted for the truss. While stamped fittings cannot profitably be used on all parts of an airplane, in the opinion of one speaker, they will be available in many places in somewhat the manner suggested by the author of the paper.

It was pointed out that a large plane must be of very special design and much on the order of the famous "One-Horse Shay." Orders for planes always call for small numbers, practically none passing 50, even on the small sizes, and being more usually in the neighborhood of ten. Not only this, but changes constantly are being asked for which the machines are going through the process of manufacture. Under these adverse production conditions it is not unusual to find a concern charging 250 per cent overhead, plus 15 per cent for profit, plus 5 per cent for incidentals and even then running up a handsome deficit.

Memorial to George W. Baum

The directors of the Mackintosh-Hemphill Co., Pittsburgh, have adopted a memorial on the death of George W. Baum, a director and member of the executive committee of the company, whose death on Nov. 26 was noted in THE IRON AGE of Dec. 4. Mr. Baum had served continuously as a director since 1903 and was vice-president from 1911 to 1922. The memorial is in part:

Mr. Baum's direct and indirect associations with Mackintosh-Hemphill Co. have extended over a long period and he was one of the last ties which bind an earlier generation of men to the present organization. As a son-in-law of James Hemphill, he zealously guarded the old and worthy traditions of this company. He was sincerely interested in the welfare of all of our employees and exemplified the thought—"A friend in need is a friend indeed," no trouble being too great for him to undertake some kindly action to help another.

We, his associates, of the board of directors and executive committee wish to record our sincere sorrow and grief in parting with a faithful and conscientious associate. We will miss his wise counsel and genial personality.

European Markets Show Greater Activity

Large Sales Reported in Nearly Every Department—Belgium
Sends Pig Iron to United States—International Organization
Plans Premature—Ruinous Competition in Rails

MARKET letters from Great Britain, France, Belgium and Luxemburg all indicate a sharp upturn in business, particularly on the Continent. Prices are higher and selling has been proceeding at a lively rate. Some of this is in anticipation of the import duties and regulations to be applied at the German frontier on Jan. 10. High costs continue to rule, particularly in Great Britain, where the condition is serious. Outstanding features in the four countries mentioned will be found in the letters following.

Improvement Shown in French Market

PARIS, FRANCE, Nov. 21.—With an accentuation of the rise that has been prevailing for over a fortnight, transactions have been increasingly numerous, while prices reached higher levels. But one wonders what the length and importance of this revival will be, as the causes which have determined it are but momentary; buying by the Germans prior to Jan. 10, to take advantage of the free entry of Lorraine products before that date; purchasing by Great Britain for fear of possible protection; buying by own consumers in the expectation of higher rates, based not only on the better tendency of the export markets, but also on the producers' refusal to grant further price concessions.

The situation might change rapidly if the commercial understanding with Germany could not be reached definitely, if the French internal loan should not yield what is expected, and if some agitation should arise for wage increases, which the narrow margin between selling price and cost does not permit.

Coke.—For October the ORCA was supplied with 269,805 tons of coke, a daily average of 9000 tons. During the first 19 days of November this organization has received 49,233 tons, a daily average of 2600 tons. Thus the deficiency in coke arrivals up to date is not less than 120,000 tons. Apart from the Lorraine iron works, which mostly depend on the Ruhr for their coke, the stocks in the plants are sufficient to meet the shortage in supply of indemnity coke. Under the Reparation Commission's plan and dating Nov. 1, the share of France in the apportionment of indemnity fuel is based on 671,000 tons a month, including 250,000 tons of coke.

Pig Iron.—The market is firmer and prices slightly upward. Export business is encouraged by improved demand. The ruling quotation for chill-cast No. 3 is around 300 to 305 fr. (\$16.15 to \$16.42) a ton at works. On the Antwerp market foreign competition is still active; Belgian quotations for foundry iron are 360 to 370 Belgian francs (\$17.70 to \$18.20); 350 fr. (\$17.20) for basic. French tenders for chill-cast stand at around 73 to 74s. f.o.b. (\$16.94 to \$17.17), while the British refuse to pay above 72s. (\$16.70), f.o.b. Hematite is a stronger market at 415 to 420 fr. (\$22.35 to \$22.60) and even 425 fr. (\$22.88) inland price (450 to 460 fr. or \$24.23 to \$24.75 in the Paris area), while export quotations are easier; satisfactory business in this line is done with Italy. In malleable iron the prices are about 440 to 450 fr. (\$23.70 to \$24.23) delivered East; 450 to 460 fr. (\$24.23 to \$24.75) in the Southwest region.

Ferroalloys.—Much better tendency in this section due to shorter output; prices are firm, especially for prompt delivery. French producers of ferromanganese are at some advantage now that the British plants have raised their price to £13 and £14 (\$60.32 and \$64.96), and that Norwegian competition has practically disappeared. Ruling quotations are 1400 fr. to 1450 fr. (\$75.39 to \$78.07). Spiegeleisen is raised by 10 fr. to 550 to 560 fr. (\$29.60 to \$30.15), delivered East.

Semi-Finished Products.—Semi-finished and finished steels largely benefited by the general rise of the market; dealings have increased in number, and certain plants are stated to be booked for two or three months ahead. The semi-finished section has been active with Great Britain and Germany; many Belgian plants have withdrawn from the market with a full supply of orders. The inland ruling quotations are: Ingots, 33 to 39 fr. (\$17.77 to \$21); blooms, 40 to 42 fr. (\$21.54 to \$22.60); billets, 42 to 44 fr. (\$22.60 to \$23.70); larges, 48 to 50 fr. (\$25.85 to \$26.90). Export rates are £5 to £5 2s. 6d. (\$23.20 to \$23.78), for blooms; £5 7s. 6d. to £5 10s. (\$24.94 to \$25.52), for billets; £5 12s. 6d. to £5 15s. (\$26.10 to \$26.68) for larges.

Wire Rods.—While there is much evidence of improvement in this line, it is not one where the general rise has been mostly felt, owing to heavy competition. The ruling price in the East is 58 to 59 fr. (\$31.23 to \$31.77). The export rates are: £6 12s. 6d. to £6 17s. 6d. (\$30.75 to \$31.90), f.o.b.

Rolled Steels.—These products are strongly competed for, but on the whole the situation is rather firm. In joists (beams) a few orders have been booked for spring shipment; delivery times are lengthened. The rates currently applied are: Joists, 48 to 50 fr. (1.15c. to 1.20c. per lb.); bars, 51 to 54 fr. (1.23c. to 1.30c.); rounds for concrete, 51 to 53 fr. (1.23c. to 1.27c.); rounds for bolts, 53 to 56 fr. (1.27c. to 1.35c.). Hoops are steadier at 68 to 69 fr. per 100 kg. (1.63c. to 1.66c. per lb.) for orders of 5 to 10 tons, delivered East works. Our export trade in this line is interesting, despite the severity of foreign competition. The average prices are: £5 17s. 6d. to £6 (1.22c. to 1.24c. per lb.) for joists; £6 to £6 2s. 6d. (1.24c. to 1.26c.) for bars, f.o.b. Antwerp.

Rails.—Competition in this section is ruinous, prices standing under the level of joists, while they should be higher: 46 kg. (93 lb. per yard) standard rails are offered at 47 to 48 fr. (\$25.30 to \$25.85). The State Railroads recently bought 3000 metric tons of 45.52-kg. steel rails at 469.75 fr. (\$25.28), Meurthe-et-Moselle works; 5000 tons of 46-kg. standard rails at 457 fr. (\$24.60), Meurthe-et-Moselle works; two lots of sleepers of 3000 tons each at 475 fr. (\$25.57), Meurthe-et-Moselle works, and 499.50 fr. (\$26.89), Lorraine works, respectively. The Egyptian Railroads purchased 7200 tons of Vignole rails, the tenders of which for open-hearth were: £6 15s. (600 fr. or \$31.32), f.o.b. Rotterdam, German price; £7 6d., or \$32.60, f.o.b. Antwerp, French price; £7 16s. 6d., or \$36.31, f.o.b. Middlesbrough, British price. The offer, made by a Lorraine firm at £6 8s. 2d., or \$29.73, in basic, was not accepted.

Plates and Sheets.—This department is less active than other sections of the market, but prices are firm, with the exception of heavy grades. These can be obtained in two or three weeks' time, while delivery quotations for medium and light sheets are longer. Some manufacturers' output is well sold up to the end of January and February; others have their production

engaged for six and eight weeks. Ruling quotations are as follows: Large flats, 66 to 68 fr. (1.59c. to 1.63c. per lb.); heavy sheets, 70 to 74 fr. (1.68c. to 1.78c.); medium sheets, 87.50 to 95 fr. (2.10c. to 2.28c.);

light sheets, 102.50 to 110 fr. (2.46c. to 2.64c.); boiler sheets, 85 fr. (2.04c.), delivered East region. The Belgian rates for export are: £7 to £7 2s. 6d. (1.45c. to 1.48c.) for 5-mm. and over.

High Costs Hamper British Steel Industry

LONDON, ENGLAND, Nov. 27.—While the position in the iron and steel trades is somewhat more healthy than has been the case for some weeks, trade is by no means out of the rut yet, and there is still room for considerable improvement. The sudden rush of buying of Continental material and the subsequent lifting of foreign prices resulted in a certain amount of buying on this side, but the works are still far from well off. Certain quantities of pig iron have been sold, in some cases for delivery well into next year, and the large stocks of Cleveland grades which were at one time menacing the market have become well absorbed, but the present limited rate of output is still sufficient to cope with the demand. Cleveland No. 3 at 82s. (\$19) does not compare favorably with Continental prices, but makers assert that lower prices cannot be thought of.

In this connection it is interesting to note the remarks of the chairman of the Cargo Fleet Iron Co., speaking at the annual meeting recently. He stated that present prices of British steel are no more than 37 per cent above those ruling just before the war, whereas gas producer and boiler coal prices are 65 per cent up and railroad rate increases are 50 per cent. In 1914 the rate on finished steel, from the company's works in Middlesbrough to Middlesbrough docks, was 12½d. a ton. Today it is 23d., including 4d. a ton flat rate, representing an increase of 84 per cent. In addition they have to meet an increase in national insurance.

"Taking these charges on coal, iron, stone and limestone," he said, "in addition to those on the works themselves, there is an increase per ton on steel, as compared with 1914, of over 282 per cent. This represents only direct payments made by the company and

excludes the contributions from the men themselves and from the Government."

It thus will be seen that the chances of British iron and steel prices coming down to anything like competitive levels are remote, unless there are drastic reductions in costs. Generally speaking, the home trade in steel is showing a little more interest, but the ordinary merchant business with such countries as India is at a low ebb. Various Colonial governments have been placing railroad contracts, including one by the New Zealand Government for about 10,000 tons of rails. This order, awarded to the Barrow Steel Works, will enable it to restart the rail mills, after having been idle for some months. New shipbuilding goes on, but only in a quiet way, Clyde yards now and again receiving contracts for boats for some of the merchant lines.

Large quantities of semi-finished Continental material have been bought by consumers in this country, and the works on the Continent are now fully sold on these specifications up to the end of the year. But the fact that buying generally does not spread over more than a couple of months rather goes to show that there is not much faith in the maintenance of prices. Of course the formation of cartels in Germany will tend to keep up prices, but nevertheless that still will leave big openings for the Belgian and French makers.

The anxiety lately of German works to secure orders is clearly shown in the low prices which have recently been accepted. In this connection it is interesting to note that 7800 tons of rails for the Egyptian Railroads was secured by Krupp at £6 15s. (\$31.32) per ton f.o.b. Rotterdam for open-hearth basic, whereas the lowest British quotation was £7 16s. 6d. (\$36.31) f.o.b., while that of the French and Belgian makers ranged up to £7 6d. (\$32.60) f.o.b.

Belgian Makers Booked Far Ahead

ANTWERP, BELGIUM, Nov. 19.—Firmness still prevails over the whole market. Much business has been done at the new prices and most makers are fully booked for a good time to come. Considering the rise of prices and the attitude of makers, nearly all export merchants still in possession of orders they accepted, when speculating on a further fall, will now have placed their orders. This uncommon activity contributed on a large scale to the success of the makers' campaign for still higher prices. It remains to be seen whether the high prices will be maintained when only the general and actual demands come through. In the meantime sellers counteract the resistance of buyers and it was difficult during the last week to obtain quotations from Belgian makers.

Foreign purchasers have closely followed the new market and placed some big orders. Large sales of rails have been made, partly to South America, while the firm offers which are reaching us now from Japan and China are quite in accordance with ruling quotations. Yet, notwithstanding this feverish and agitated turn of the market is certainly not yet over, the tendency is much weaker.

Finished Steel.—Bars have been well sought after. Works have been able to book large quantities at prices up to £6 2s. 6d. per ton, f.o.b. Antwerp, or \$28.35 (1.27c. per lb.). Time of delivery is very distant. It is reported, however, that last quoted prices were somewhat easier and certain works would have accepted the reduced price of £6, or \$27.60 (1.24c.). Germans, after having abstained from quoting for two to three weeks, have been offering on the London market at the latter price. Beams are booked at £5 15s. (1.19c.), which is the new quotation of German exporters. Approximate

prices for steel products per metric ton and f.o.b. Antwerp, together with prices of a fortnight ago, for comparison:

	Nov. 5 Fr.	Nov. 19 Fr.	Nov. 19 C. per Lb.
Bars	530	585	\$28.15 1.28
Beams	525	550	26.45 1.20
Rods	600	650	31.25 1.42
Corrugated bars...	650	675	32.45 1.47
Hoops	750	800	38.45 1.74
Cold rolled hoops..	1,000	1,120	53.85 2.44
Drawn squares ...	975	1,025	49.30 2.24
Drawn rounds ...	950	1,000	48.10 2.18
Drawn hexagons..	1,050	1,100	52.80 2.39
Rails	725	.....	(34.85)
Spring steel	1,000	1,150	55.30 2.51
Wire rods	580	645	31.00

Large orders for rails have been booked, but no works will for the moment indicate a definite price. Most Luxemburg and Lorraine works are out of the market. Their nominal prices are approximately as above.

Billets.—The demand for blooms and billets remains steady at prices as high as £5 10s. per ton, f.o.b. Antwerp (\$25.30). Unfortunately works, even at this high price, are not inclined to book, while on the other hand higher bids from foreign purchasers are not obtainable. Therefore one has to conclude that, even in this firm market, nearly no business has been done. Semi-finished products are quoted as follows:

	Fr.
Thomas billets	525 or \$25.25
Thomas blooms	500 24.05
Thomas sheet bars	540 25.95
Thomas steel bands	725 34.85

Iron.—Prices for iron commodities increased nearly in the same proportion. Makers acquired a much bet-

ter situation as, owing to the general firmness of the steel market, demand grew. Prices are:

	Fr.
Commercial iron No. 2.....	600 or \$28.85
Commercial iron No. 3.....	620 29.80
Commercial iron No. 4.....	650 31.25

Sheets.—The sheet market, after having been much firmer, has now somewhat declined. Several works still want orders, especially for heavy material, and therefore do not stick so much to the prices reached on the general rise. Thin sheets are firmer. Prices are:

	Fr.	C. per Lb.
Thomas soft steel, 0.5 mm. (No. 25½ gage).....	1,250 or \$60.10	2.73
Thomas soft steel, 1 mm. (No. 19½ gage).....	1,150 55.30	2.51
Thomas soft steel, 2 mm. (No. 14 gage).....	885 42.55	1.93
Thomas soft steel, 3 mm. (No. 11½ gage).....	730 35.10	1.59
Thomas soft steel, 4 mm. (No. 9 gage).....	675 32.45	1.47
Galvanized sheets, 0.5 mm....	2,300 110.55	5.01
Galvanized sheets, 1 mm....	1,750 84.15	3.82
Polished sheets	1,600 76.90	3.49

LUXEMBURG IRON AND STEEL

Prices Improving—Pig Iron Sold Through January—International Cartels Unlikely Just Now

LUXEMBURG, Nov. 23.—The price decline which lasted the whole of October was followed by a slight reaction, accentuated during the last few weeks. Some plants, desirous not to lessen their activity, have accepted a sufficient amount of orders.

Far East markets are weak, though some sort of a revival is noticed in China. Japanese trading is impeded by the depreciation of the yen. Business in South America remains stationary; buyers are holding back, as generally occurs when prices are unsteady.

Talk of Cartels Held Premature

Much has been said in the European press, of late, about the possible formation of international iron and steel cartels or trade combinations. The opinion prevailing here is that the idea is a little premature. Were an accord on principle to take place in the more or less immediate future, the value of the commercial bodies created by certain plants or groups would be considered in the distribution of quotas among the members, while a few years ago the capacity of output of the participating enterprises was the only basis taken into consideration. There were not at that time so many selling organizations and ramifications which now are closely bound to the great technical forces of the large producers.

Pig iron output is well sold up to the end of January; one furnace has just been relighted at Dommeldange (Arbed). Average current prices in Belgian money are: Foundry iron No. 3, 360 to 370 fr. (\$17.78 to \$18.27); basic, 345 to 350 fr. (\$17.04 to \$17.28) f.o.b. Antwerp; foundry iron No. 3, 330 French fr. (\$17.80) f.o.b. Dunkirk; semi-phosphoric (1.3 to 1.5 per cent phosphorus) 350 to 355 fr. (\$18.88 to \$19.15).

The semi-finished department is generally firm and prices very high at £5 to £5 2s. 6d. (\$23.20 to \$23.78) for blooms; £5 10s. to £5 12s. 6d. (\$25.52 to \$26.10) for billets; £5 15s. (\$26.68) for targets. In the rolled steel section, important orders of rails were received from the United States. Beams and bars are worth: £5 15s. to £5 17s. 6d. (1.19c. to 1.22c. per lb.) and £5 17s. 6d. to £6 and £6 2s. 6d. (1.22c. to 1.24c. and 1.26c.) respectively. Transactions at that price are impeded by the Germans offering, in London, at £6. Wire rods sell at £6 12s. 6d. to £6 15s. (\$30.75 to \$31.32) f.o.b. Antwerp. The Arbed Co. has a full supply of orders up to the end of January.

October exports of steel rails from the United States included 11,682 tons of 50 lb. per yard and over, and 1559 tons of less than 50 lb. per yard. The larger sizes accounted for \$459,023, or \$39.29 per ton, while the smaller sizes accounted for \$63,954, or \$41.02 per ton, according to figures of the Department of Commerce, Washington.

Pig Iron.—As expected, prices are rising quickly and makers are nearly fully booked for months. Belgian demand and purchase are large. Holland also has bought largely in Belgium. Luxembourg works have sold big quantities to Germany, while French makers have contracted big sales in America, especially for the Atlantic coast. High prices have been paid from these countries, also from England, where, however, the purchases were not so numerous as before.

With this new situation phosphoric foundry with 2.5 to 3 per cent Si is quoted at 370 to 375 fr. for the inland, i.e., \$18, f.o.b. Antwerp, but most probably for limited quantities. Semi-phosphoric foundry iron with 2.5 to 3 per cent Si has not much changed. The ruling price is between 380 and 400 fr. (\$18.60 and \$19.60) per ton, f.o.b. Antwerp, according to quality and quantity.

Coke.—The coke syndicate has just been re-established. The price for furnace coke has at the same time been put at 150 fr. per ton, i.e., \$7.25.

GERMAN LABOR TROUBLES LOOM

Lowered Standard of Living, Caused by High Prices and Low Wages, Makes Industrial Unrest

BERLIN, GERMANY, Nov. 27.—With the gradual improvement in economic conditions the number of industrial disputes is growing. Wages, which during the rapid depreciation of the currency last year had been exceedingly low, attained a fair level at the beginning of this year. Since then the employers have systematically increased working hours and have kept wages low, without encountering any great opposition from their employees, as the funds of the trade unions, which were only small at the end of the currency inflation, have been heavily depleted by the large unemployment prevailing among their members during the last few months.

Unskilled workmen now receive about the same pay as in 1914, while the wages of skilled men are 11 per cent below pre-war standards. At the same time commodities are about 25 per cent higher than in 1914. The trade unions are now putting forth a demand for a general rise in wages of 10 per cent, but an award given by an arbitrator for the engineering industry has been rejected by the employers. Now that trade is reviving there is a growing restlessness among the employees and, with a further improvement in business, the accumulated anger among the workmen will cause extensive controversies between masters and men and large strikes will have to be reckoned with.

In the coal industry also there is a movement for higher wages and notices of the termination of the wage agreements have been given in most districts. Though the terms of some of the agreements have been extended by the finding of official arbitrators in several districts, there will be new negotiations all around. Negotiations in the Ruhr coal industry so far have proved abortive.

It is generally realized that the standard of living of the German working class is at present considerably lower than prior to the war, but the Government considers the demand of the unions premature and holds that the movement for a reduction in prices would be severely checked if the increases were granted.

Luxemburg Iron and Steel Output in October

LUXEMBURG, Nov. 23.—Number of furnaces active on Oct. 31: Arbed, all 6 at Esch; all 6 at Dudelange; 2 of the 3 at Dommeldange. Terres Rouges, all 6 at Belval; Esch closed down. Hadir, 8 of the 10 at Differdange; Rumelange closed down. Rodange, 4 of the 5; Steinfort, 2 of the 3.

Production Figures

Pig iron, basic, 186,027 tons; foundry, 3010 tons; forge, 35 tons; total, 189,072 tons.

Steel, basic, 166,107 tons; open-hearth, 1333 tons; electric, 718 tons; total, 168,158 tons.

BUREAU OF STANDARDS REPORT

Cites Notable Accomplishments of Bureau in Aiding Industry—Large Increase in Number of Tests Conducted

Scientific investigations and tests resulting in large savings to the Government and to American industry through improvement in processes and the fixing of uniform standards are featured in the annual report of Dr. George K. Burgess, director of the Bureau of Standards. Investigations made during the year with orifice meters for measuring gas, corrosion of underground pipes, tests conducted covering impact stresses in highway bridges, braking systems for automobiles and other studies have resulted in the application of improved methods in engineering practices that are of direct and substantial savings to the industrial public.

Other contributions to the public interest enumerated in the report are the successful development of methods of reducing the loss in the baking of Japan ware, assistance rendered the optical-glass industry in the United States, progress made in the better utilization of cotton linters and other cotton wastes, and the development of a method for reclaiming gasoline from dry-cleaning processes. During the year just closed 135,852 tests were conducted by all divisions of the bureau, as compared with 115,729 in 1923.

"Most of the tests of the past year were executed for other branches of the Government, practically every

branch making use of the facilities provided. A great deal of testing, however, is done for commercial firms and for individuals, over 40,000 test folders, covering over 600,000 such tests, for which a charge is made, having been issued since the founding of the bureau. The Government work is given precedence, however, and in some cases all testing except that for the Government has had to be refused because the demand exceeds the facilities for doing this work."

Cooperation with American Industries

Inability to meet this demand is unfortunate, Dr. Burgess points out. It is desirable for the bureau to carry out tests for outside parties, not only as a means of assisting American industries and citizens but also because the information so gained is of value to the bureau. "The Bureau has no intention of entering into competition with commercial testing laboratories, but there are certain classes of work which it is considered desirable for it to undertake, because the results would be of public benefit."

Over 85 per cent of the scientific instruments used in the United States are manufactured in this country. There has been a tremendous extension of the use of instruments in all fields of industry. In the meantime the bureau's facilities for testing these types of apparatus have not been materially increased and American manufacturers have been greatly handicapped by their inability to get adequate service from the bureau in developing and testing their instruments.

Sulphur, Oxygen, Copper and Manganese and the Red-Shortness of Iron

An investigation has been undertaken to throw light on some disputed matters as to the elements in iron which cause it to be brittle when worked on a forge or otherwise above a red heat. Sulphur is generally admitted to be a cause of this defect, but data as to the minimum percentage of this element necessary before red-shortness disappears are rather meager. Oxygen has been considered by many metallurgists to be as important in this regard as sulphur. The opinions on effect of copper are quite variable. Manganese is conceded generally to be a corrective for the red-shortness caused by sulphur and is thought by many to prevent or help prevent the red-shortness supposed to be caused by oxygen. Data as to the amounts of manganese to be used are given in the literature, but are in some cases contradictory.

Much of the discrepancy in views regarding effects of some of these elements is due to studies having been made on commercial steels in which it is difficult to insure that the element or elements studied are the only important ones present. This investigation has, therefore, been made with electrolytic iron or commercially pure iron as raw material. The melts were small (900g. approximately) and made under fairly good control in carbon helix vacuum furnaces or in a high-frequency induction furnace under air. The copper added was over 99.9 per cent pure and the manganese over 98 per cent. The carbon content of the samples in most cases did not exceed 0.60 per cent. The ingots were forged to 1/2-in. bars and then tested for red-shortness by bending back and forth over a blacksmith's anvil in a temperature range of 1100 to 500 deg. C. Samples classed as free from red-shortness were those which stood such a test without breaking.

The conclusions of this study, made by the Bureau of Standards, are:

1. Sulphur is the principal element responsible for red-shortness. In order to prevent red-shortness in iron, not more than 0.01 per cent sulphur should be present.
2. Oxygen in amounts up to 0.20 per cent does not cause red-shortness in pure iron if the sulphur is below 0.01 per cent.
3. Manganese may prevent red-shortness in iron when present to the extent of three times the sulphur percentage if the oxygen percentage is not above 0.04 per cent.
4. The presence of considerable amounts of oxygen in irons (0.10 per cent and above) tends to reduce

the efficiency of manganese in preventing red-shortness. The hypothesis is advanced that this is because some of the manganese reported in such irons is present as oxide.

5. Copper (0.05 to 0.5 per cent) is of minor importance in its effect on red-shortness of pure iron, but in some of the specimens described in this paper it tended to decrease the red-shortness.

A complete description of this investigation will be found in Technologic Paper No. 261, copies of which may be obtained from the Superintendent of Documents at 10c. each.

Items of Waste

During normal times about 1,800,000 persons are out of work and about 35 days per year per man are lost by unemployment by each of the 12,800,000 industrial wage earners, according to Magnus W. Alexander, managing director of the National Industrial Conference Board, New York, speaking before the Indianapolis Chamber of Commerce, Nov. 17.

Referring to extravagance in government, Mr. Alexander pointed out that governmental expense in 1923 was \$10,045,000,000, or 15 per cent of the national income in that year, a sum equivalent to 93 per cent of the total amount paid out in wages and salaries in 1921 by all manufacturing industries covered in that year's census of manufactures. "Governmental expense in 1902 represented 8.3 per cent of the national income in that year and 7.6 per cent of the national income in 1890.

Taxes in 1923 consumed one-eighth of the national income, as compared with one-sixteenth in 1890. "When it is borne in mind that one person in every 12 of the United States is on the Government payroll, there is surely grave room for thought as to whether we are not wasteful about man-power and money, and whether considerable retrenchment is not possible."

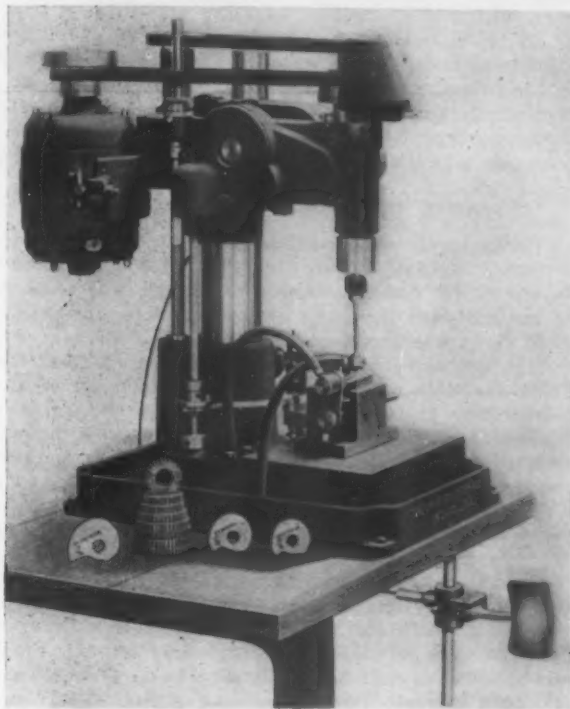
A voluntary petition in bankruptcy has been filed here by the Gray Machine & Parts Corporation, 1459 Niagara Street, Buffalo. Liabilities of \$30,211.45 and assets of \$25,739.14 are listed.

The American Management Association will hold its annual convention at the Hotel Astor, New York, Jan. 28, 29 and 30, 1925.

Automatic Drilling Machine for Small Parts

An automatic drilling machine intended both for large-scale drilling of holes in small parts and for general use either as a power or hand feed drill press has been put on the market by the Charles Stecher Co., 2452 North Greenview Avenue, Chicago.

The general arrangement of the machine may be noted from the illustration. Three speeds are available, both the spindle and motor being equipped with three-step cone pulleys. Change gears provide for reg-



Automatic Machine for Production Drilling of Small Parts. It is intended also for general use as a power fed or sensitive hand fed drill press. Operation is controlled by the knee-actuated device under the bench

ulating the feed to suit various conditions. Jigs to hold small parts of various shapes are available, and dial, rotary or magazine feed may be provided also.

In operating the machine momentary pressure on the knee control under the bench releases a positive clutch in the drill head and it in turn engages the feed cam mechanism. The feed cam then makes one revolution, feeds the drill through the work, withdraws it and stops. The work, as the drill approaches it, is automatically clamped into position by a device operated from the vertical side shaft. This shaft is connected under the base to a knockout air cylinder, which in turn is connected by means of a flexible tube to the cylinder and combination piston plunger attached to the jig. Thus, as the cam completes a cycle and withdraws the drill, the clamp is automatically released and the work is rejected by the piston plunger. In the meantime the operator has both hands free so that he can quickly insert new work, press the knee control and cause the cam to make another cycle. When the work can be fed continuously it is only necessary to apply constant pressure against the knee control. The feed cams are shaped so that the idle travel of the drill to and from the work is at a rapid rate. Cams of three sizes are furnished, and the sizes marked on the cams indicate the depth of hole to be drilled. The spindle, power feed shaft, idler pulley, pump and motor are equipped with ball bearings.

The head, carrying the motor, spindle and feeding mechanism, is adjustable up and down by means of the vertical screw shaft and crank. After a given adjustment has been made, the head is firmly secured

to the base by means of a clamping handle. Attached to the head-adjusting screw shaft is a micrometer dial graduated to thousandths of an inch for use where it is desirable to set the drill in close relation to the work, a feature which is of advantage when drilling blind holes to specified depths. The coolant pump is driven by the vertical power feed shaft.

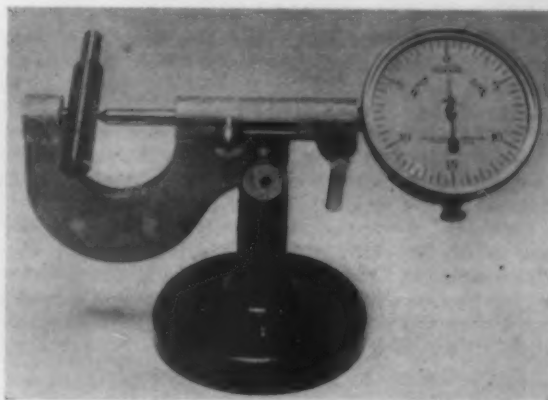
More Malleable Castings in October

Improvement is noted in the production and shipments of malleable castings in October over the figures for September, according to reports to the Department of Commerce. October production of 140 plants was 50,066 gross tons, compared with 41,507 tons in September and with 62,238 tons in October, 1923. The current figure is the largest since April. Shipments in October amounted to 44,978 tons, compared with 40,480 tons in September and with 59,129 tons in October, 1923. The current figure is the largest since May. Orders booked in October were 54,589 tons, compared with 48,729 tons in September and with 48,621 tons in October, 1923. Except for January, February and March, the current bookings are the largest in more than a year.

Comparing 119 identical plants over the past thirteen months, October production was at 44.2 per cent of capacity, the highest figure since May. It is only two-thirds the capacity operating in March, however, which was 66.5 per cent. The low point was in July, with 28.4 per cent. In October of last year these plants were operating at 59.9 per cent.

Pitch Diameter Gage

A dial indicating gage adapted for the rapid measuring of the pitch diameter of taps and bolts is shown in the accompanying illustration. The range of the gage is from 0 to 2 in. and the dial indicator is graduated in half thousandths, allowing 0.03 in. to one complete turn of the hand. The anvil, being adjustable, permits work up to 2 in. in diameter to be checked. The entire gage, which is a recent addition to the line



Indicating Gage for Rapid Measurement of Pitch Diameter of Taps and Bolts

of the Federal Products Co., 15 Elbow Street, Providence, and is designated as the model No. 45, may be screwed down and used on a bench.

The postponement three times of the receivers' sale of the Atlas Steel Corporation, Dunkirk, N. Y., is due to efforts of the receivers to avoid sale, if possible, and work out a reorganization plan. Improvement in the iron and steel trade outlook has led the receivers to feel they may yet solve the company's financial problems.

Organization for Better Foundry Practice

One Man vs. Decentralized Control—Analysis of the Business Before Changing to Decentralized Control—Successful One-Man Operation and Its Limitations

IN a survey of more than 50 foundries it was learned that organizations which carefully plan for proper distribution of responsibility, for coordination of the several departments, and for the protection of each important position with an understudy, are replacing foundries dominated by one man. Better results were observed when the working force and the employer had a common responsibility for the success of the entire plant than when an individual at the top concentrated all the power in himself.

A foundry manager, attempting to carry in his mind the large amount of detail connected with all departments, unfits himself for attending properly to duties falling naturally on the head of an organization. The basis of successful foundry management, as in all enterprises involving cooperation, is coordination and sharing of responsibility. An organization arranged to give each phase of the business adequate and coordinated attention, and to allow it to work harmoniously, puts the foundry in a favorable competitive position.

All larger plants visited (16 having 200 or more employees) had decentralized control or distribution of responsibility. One-man domination was observed in 17 out of 38 smaller plants. The table shows the frequency of one-man organization versus functional organization.

One Man Control vs. Decentralized Control					
Number of Employees in Plant	Number of Plants Visited	Number Controlled by One Man	Per Cent Control	Number with Decentralized Control	Per Cent Decentralized Control
Up to 50	7	5	72	2	28
51 to 100	10	5	50	5	50
101 to 200	21	7	33	14	67
201 to 500	6	0	0	6	100
Over 500	10	0	0	10	100
Total	54	17	31	37	69

How One Foundry Changed

An interesting transition from one-man domination to decentralized responsibility was observed in process in a jobbing foundry employing 110 men. The owner was the dominating spirit around which all activities centered. He could tell on a moment's reflection the location of the core-box used for the clutch on the "Big Products Co.'s" machine. It had not been used for two years; the foreman knew the core-box was somewhere about the plant, but the owner could go directly to the location, for he was familiar with every detail.

Competition was becoming daily keener. New business called for sales effort and service work. Many details consumed the owner's time and the resulting load on him occasioned a study of ways and means of distributing the work. Analysis of the business showed the following major activities:

1. Selling
2. Producing
3. Purchasing
4. Financing
5. Accounting
6. Employing
7. Maintaining Plant

Fig. 1 represents the organization before rearrangement. The owner was the center of all activities: the divisions of the chart show the approximate attention he devoted to each activity. While he had business connections of great value in financing and selling, his

training had brought him successfully through the positions of molder, foreman and superintendent, and he leaned naturally toward the producing side of the business, with relative neglect of other activities.

As no understudy or assistant had been developed, capable of taking over the several functions performed by the owner, his withdrawal would have meant a disruption of the business. None of the foremen in the producing departments had a grasp on the entire business, nor had they been given opportunity to gain it.

Changing to a Decentralized Organization

Preparations were necessary for installing a cost system. A well-trained foundry executive having knowledge of modern production methods was brought in and assigned the work of preparation. He constituted the production department.

His first move was a survey of the plant's facilities. From available records an estimate was made of the comparative costs of various classes of work. The equipment available and the comparative cost figures showed that the foundry was best fitted for quantity production of small castings.

The equipment was gradually rearranged for the manufacture of small castings in quantities, interfering as little as possible with present production and according to a prearranged layout of the plant. A pattern storage system was installed. Control of patterns was placed with the pattern storage clerk. Data on patterns were maintained in a loose-leaf record. Flask storage was systematized. Raw-material storage was arranged to facilitate the handling of materials. Departments were located to insure flow of materials with a minimum of handling.

A production system was installed for planning and scheduling work in the plant. A clerk was provided to assist the production man in planning and scheduling work and issuing orders to the plant. The installation of the system was made gradually, to avoid disrupting production.

This plant was visited one year after the production man entered its employ. A conservative policy had guided all changes and the production system was working smoothly at this time. Costs were found during this period by supplementing the old cost records with information necessary to more accurate figuring of cost data. The installation of a cost system by the local foundrymen's association was well under way in other foundries of the district and the production records had been planned to meet the needs of the system in this plant. It was prepared now for the installation of this cost system.

Fig. 2 represents the new organization. Decentralization had resulted in the following changes in employees:

1. *Additions:* Production manager, production clerk.
2. *Changes:* A new superintendent was brought in. An experienced pattern storage clerk replaced the man in charge of patterns.

The production manager supervised a large portion of the work. The detail was carried out by members of the respective departments, thus giving the production manager time to study possible developments. This preparatory work had accomplished the following benefits for the foundry:

1. The owner, now acting in a supervisory capacity, was relieved of detail and was able to devote most of his time to sales, service and finance.
- 2.—The owner, production manager and superintendent cooperated as an advisory council on general policies. Foremen were consulted on all matters affecting their respective departments.

THIS is the second of a series of foundry studies made by the policyholders' service bureau of the Metropolitan Life Insurance Co., New York, as a service to its group insurance policy holders in the foundry industry. The first appeared at page 1334, THE IRON AGE, Nov. 20.

- 3.—A production system, functioning smoothly, permitted the production man to leave planning and scheduling to his assistant and to devote some of his time to sales, purchases and supervision of accounting and costs.
- 4.—Hiring and firing of men was centralized in the foundry superintendent.
- 5.—Withdrawal or death of the owner or superintendent would not disrupt the business since (a) the production man, as an understudy, could step into the place vacated; (b) the molding foreman was fitted to take over the superintendent's work, and (c) throughout the organization understudies had been developed capable of stepping into the key positions.
- 6.—A definite sales policy was adopted fitted to the foundry's facilities, providing for specialization on small castings in quantity with a view to meeting competition under favorable conditions.
- 7.—Purchases of equipment and materials were made on the basis of actual requirements and as nearly as possible in favorable markets.

active operation of the plant, could have helped considerably in tiding over the period of reorganization necessitated by the owner's forced withdrawal.

Results of One-Man Operation

The attempt by one man to dominate all operations of the business usually results in one-sided direction of the enterprise, the one side being that of the natural bent of the head. In one plant, managed by an owner whose interests were chiefly financial, buildings were in need of repair, equipment was antiquated and working conditions poor.

In another case a practical molder headed the business. Costs, accounts and any form of clerical work seemed to him non-essentials. After attending a demonstration of a certain type of equipment he purchased three units for his plant without any further consideration than the physical demonstration of the machine's

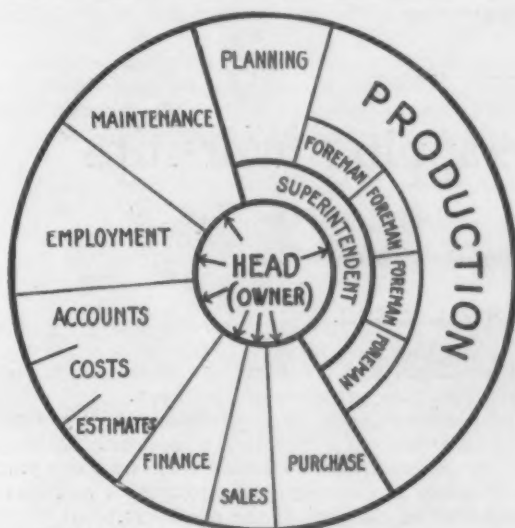


Fig. 1.—(Above) Original Organization

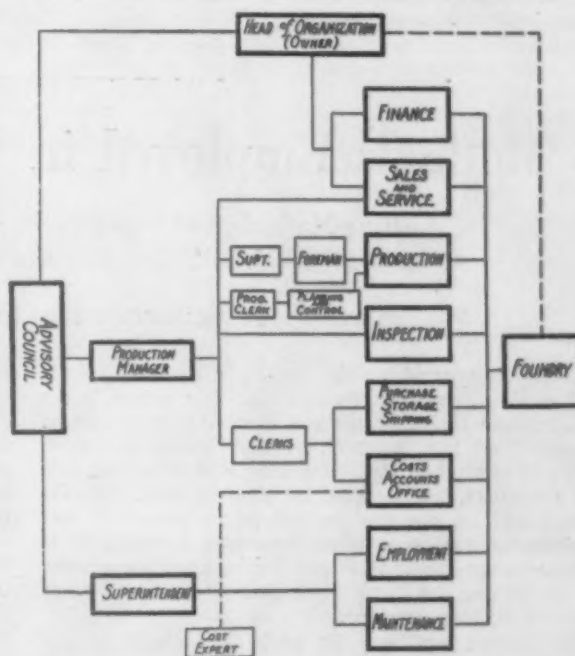


Fig. 2.—(At Right) New Organization

- 8.—Each foreman was held responsible for his department for the delivery of materials on schedule to dependent departments. Close tie-up of departments facilitated continuity of work.
- 9.—A maintenance policy administered by the superintendent assured upkeep of buildings and equipment.
- 10.—Production records permitted accurate estimating; production control along with a well balanced organization assured deliveries on time.

One-Man Operation

Three foundries were notable instances of one man successfully controlling and directing activities. In two of these plants an understudy or assistant carried a large amount of the production detail, although acting under the direction of the owner. In a third foundry successful operation over a period of years had been developed on a quality output. The owner was the intermediary between all departments. Foremen were not in active touch with their neighboring departments.

Subsequent removal of the owner by disabling illness showed the defects in such an organization. There was a virtual crumbling of the business. An office assistant, with limited knowledge of the business, was placed in charge. As a result, there was no control of the foremen and no coordinating factor; delivery dates were not met; complaints of customers brought additional promises, broken subsequently; the shipping room was crowded with parts of orders awaiting completion, and failure to deliver castings on schedule resulted in the loss of a large amount of business.

One foreman, understudying the owner during his

ability. The construction and layout of his plant militated against efficient use of the equipment. Although the machines were of great value in plants adapted to their use, in this instance they accomplished no more than hand methods, occupied valuable space, and represented a large and unprofitable investment.

Interest in the cost detail of the business led one foundry manager to install a system designed to trace every detail of costs and record them with a number of forms. But the departments of the plant were poorly arranged for flow of materials, with resulting excess handling.

Difficulties of Reorganization

In several small plants managers claimed that the small marginal profit from the business prohibited the introduction of new management practices. In such cases one or more departmental foremen can plan the time given departmental matters so as to allow time for attention to other affairs of the business, and thus relieve the head of considerable detail, to the extent of taking over some of his major managerial functions.

Foremen, in turn, may often profitably be relieved of detail by an understudy, recruited from the department and trained to take over responsibility by spending part of his time in supervisory work. In this way the several key positions in the plant may be covered with understudies gradually made familiar with the responsibilities of supervision.

The extent of relief profitably given executives will depend on the size of the business. The expense involved consists of the cost of time required to bring

about systematic planning of the executives' day, and to train understudies. Offsetting this expense is the added interest of foremen accorded greater responsibility, incentives to workmen to gain the understudy positions, a chief executive free to give thought to the development of the business, and an organization tied closely together through an intelligent interest in the operation of the entire business.

In the Medium Size Plant

A review of an organization formed to supplant one-man operation in a medium size plant revealed factors necessary for its successful operation. Distribution of responsibilities was planned and carried out, relieving the chief executive and allowing him to extend his activities to development problems.

The new organization achieved greater output than under one-man control. Other plants operating under somewhat similar conditions secured even better results, because effort to enlist cooperative spirit, and thus to obtain good teamwork, was lacking in this particular instance.

All large plants visited were operated by an organization in which responsibilities were distributed. Each section-head was held responsible for the performance of his section in its relation to the whole organization. Responsibility for pattern storage operation, maintenance of plant and equipment, or any other specific plant activity on which uninterrupted operation depended, was placed on one individual. In most cases this individual was understudied by a worker in his section or a clerk trained to take up the work in emergencies.

Distribution of responsibilities in large organizations, however, may result in duplication of effort. Clear definition of responsibilities and activities helps eliminate this defect. An organization chart showing the relationship of departments, and a manual outlining the duties and limitations of sections, are effective in avoiding overlapping, provided they are actively maintained. Plants operating successfully endeavor to instill a spirit of rivalry and cooperation. Published records of accomplishment, comparison of sections on similar work, and round table discussions among section heads are some of the means employed.

Methods Employed in Scrapping Warships*

Cutting Methods and Equipment—Economical Use of Oxy-Acetylene Torch Requires Competent Men

BY COMMANDER HENRY E. ROSSELL, U. S. N.

IN scrapping warships the generally accepted means of cutting ferrous materials, including armor, is the oxy-acetylene torch. Some use has been made also of hydrogen, but it is doubtful whether this substitution results in economy. Hydrogen can be obtained cheaper than acetylene, but it must be used in much greater volume, and its use also results in an increased consumption of oxygen. When hydrogen is used, it is necessary to provide a flashback for each torch operator. The generating outfit for hydrogen is much more expensive than for acetylene.

The carbon arc may be used successfully to cut brass, bronze, copper and cast iron, but it is not economical for cutting steel of the thickness encountered in warships. The glare of the arc is extremely disagreeable to workmen in the vicinity, and the power leads required for the arc are heavy and expensive. The arc is valuable in segregating nonferrous materials.

It is not generally appreciated that in scrapping work the cost of oxygen and acetylene amounts to as much as, or more than, the labor cost for the torch operators. If the gases are used in flasks, the cost of handling these flasks and the wasted time of torch operators due to moving torches from flask to flask are items of considerable importance.

Economy in Use of the Torch

Unquestionably the most important problem to be solved by the shipbreaker is the economical use of the oxy-acetylene torch. In this connection the following points are mentioned:

1. The type of equipment to be used should be standardized. If this be done the expense of maintaining the equipment and the difficulty of properly regulating gas pressures and methods to be employed by the torch operators will be much reduced. There are a number of good torches on the market, any one of which should prove satisfactory for the work.

2. The tendency on the part of most torch operators is to use excessive gas pressures. This practice perhaps results in a slightly greater speed in cutting, but the resulting labor saving is much more than offset by the increase in the gas bill. The sizes of torch tips used for different thicknesses of material should be

definitely fixed, and the operators should be required to conform to the practices decided upon.

3. Operators should be required to return promptly to the tool room any defective equipment. Attempts made by the operators to repair their own equipment usually result in damage to the equipment and loss of cutting time on the part of the operators.

4. A close watch should be kept for leaks in gas lines and in gas equipment, and any leaks found should be promptly repaired. In case gases are used in flasks, a check should be kept on the pressures of flasks turned in as empty. It probably will be found that many such flasks still contain a considerable amount of gas.

5. Even if only one battleship is to be scrapped, it probably would pay to lay down oxygen and acetylene pipe lines and to install an acetylene generating plant, rather than to use the gases from flasks. The use of pipe lines results in economy of cutting time on the part of operators, elimination of cost of handling flasks, better control of pressures and economy in the cost of acetylene. Unless a large amount of scrapping is to be done, it probably would not pay to install an oxygen generating plant, but this gas may be piped by attaching high-pressure oxygen flasks to a manifold connected direct to the pipe line. Two such manifolds should be provided, one for flasks being discharged and the other for changing from empty to charged flasks. The pipe lines should be provided with manifolds placed at convenient locations on or alongside the ship to be scrapped. Each acetylene manifold should be provided with a flashback.

6. It is mistaken economy to employ low-grade torch operators. A skilled man can be obtained for 10 or 15c. an hr. more than one of mediocre ability, and the latter will more than make up the difference in pay by using excessive quantities of oxygen and acetylene. It is difficult to gage the efficiency of torch operators unless the actual daily output of each man is measured. The practice of measuring the output of operators is strongly recommended.

7. Warships usually have many coats of paint over all surfaces. This paint is a great hindrance to economical cutting and is also a menace to the workmen, especially the torch operators. In confined spaces, it is economical to have men scale off the paint along the lines to be followed by the torch operators. The removal of paint in this manner reduces the evil effect.

*Abstracted from a paper read Nov. 13 before the Society of Naval Architects and Marine Engineers, at the annual convention in New York.

of paint fumes and also results in greater speed of cutting and less consumption of gases.

8. Even when scaling of paint is done extensively, trouble with lead poisoning is likely to be encountered. To guard against this disease, all torch operators should be provided with respirators and should not only be thoroughly instructed in their use but should be required to wear them while cutting in confined spaces.

9. The cutting speed below decks is so low that it is of the greatest importance to regulate the work so as to provide the maximum of ventilation for the torch operators. This consideration is likely to be the governing one in laying out the general scheme of cutting and in deciding upon the handling facilities required.

General Procedure, Cranes, Working Space

The best means of providing proper ventilation for the torch operators is to remove material from the ship in large pieces, thus opening sections of the ship to a free circulation of air. This is possible only if a crane of large capacity is available. A crane of capacity of at least 50 tons should be available for scrapping battleships, and a capacity of double this amount is of great advantage. The Philadelphia Navy Yard is equipped with a crane of 350 tons capacity on the fitting-out pier. This capacity is excessive and is of doubtful advantage, as the large capacity is

obtained only with the sacrifice of speed of operation. This crane has been found very effective, however, in removing intact heavy weights such as 8-in. turrets, 12-in. guns, and large sections of the structure of the ships. The whole bow of the Minnesota was removed and placed on the pier by this crane. The removal of this section from the ship gave free access of air to the operators working in the vicinity.

If the method of cutting a ship in large pieces is to be followed, considerable ground space must be provided upon which to place the large pieces preparatory to cutting them up into shipping sizes. This space must be provided with quick-working cranes of small capacity, suitable for loading the material into cars for shipment. The Philadelphia yard found the space on the pier within the working circle of the 350-ton crane adequate for this purpose when one ship was being scrapped on each side of the pier abreast the crane. The working space available was about 2200 sq. yd., not including space taken up by railroad tracks. Additional space was used at the head of the pier for cutting up light material, such as masts, stacks, etc. An average of two locomotive road cranes, each of 20 tons capacity, were used in handling material on the pier and from the pier to cars.

The capacity of the pier is about 200 tons a day when the large crane is worked 14 to 16 hr. daily.

French Iron and Steel Production Up

Output for Half Year Highest Since 1919—Gain Over 1923 Was 60 Per Cent in Pig Iron and 50 Per Cent in Steel

FRENCH production of pig iron reached 3,786,179 metric tons during the first half of 1924, according to the statistics of the Comité des Forges de France. The blast furnace output was 3,747,654 tons and the electric furnace output 38,525 tons. The tonnage produced, therefore, shows the appreciable increase of 1,429,264 tons, or over 60 per cent, above the production for the corresponding period of 1923, says a report to the Department of Commerce from Paris. This is the best result obtained in any six-month period since 1919.

Blast furnaces in operation, 127 on Jan. 1, 1924, increased to 137 by the middle of the year; two were blown in in the Eastern district, seven in Lorraine and one each in the Northern and the Southeastern district, the latter offset by one blown out in the Southwestern district. The recovery was the most appreciable in regained Lorraine. It should not be forgotten that this region suffered most from the consequences of the Ruhr events.

By grades, the production of iron in France during the first half of 1924 comprised 2,696,586 tons of basic pig, 744,581 tons of foundry pig, 228,537 tons of pig for puddling, 8706 tons of Bessemer pig, 3259 tons of O. M. pig, and the remainder special cast iron.

During the first half of 1924, 86.8 per cent of the pig iron was phosphorus, 10.4 per cent was hematite, and 2.8 per cent was special cast, as compared with 83.7 per cent phosphorus pig iron, 12.5 per cent hematite pig iron, and 6.8 per cent special cast iron during 1923. Of the total output, 1,526,364 tons was produced in the East, 1,454,885 tons in Alsace and Lorraine, 295,551 tons in the North, 113,791 tons in the Center, 103,184 tons in the Southwest, 71,444 tons in the Southeast, and 221,260 tons in the West.

Steel Ingots and Castings

Production of raw steel in France during the first half of 1924 reached 3,395,261 tons, of which 3,312,729 tons was ingots and 82,532 tons was castings. This is an increase of 1,123,805 tons, or 50 per cent, over the corresponding period of 1923, and corresponds to a rate of production of 97.3 per cent, which approaches the production obtained in 1913 by the plants now within the French frontiers. The increase in the output of the Eastern district and in regained Lorraine was rapid.

Of the output of steel ingots and castings, 64.6 per cent was Thomas, 1.4 per cent was Bessemer, 32.8 per cent open-hearth, 0.2 per cent was crucible, and 1 per cent was electric furnace. Details are given in the table.

Metric Tons of Steel Ingots and Castings Produced

District	Thomas	Open-Hearth	Bessemer	Crucible	Electric
Eastern	940,532	230,669	.....	.....	500
Northern	171,833	226,311	29,067	13	644
Central .....	.....	252,754	4,370	7,211	10,620
Southwestern ..	.....	35,212	12,756	.....	2,283
Southeastern ..	.....	38,920	.....	.....	18,841
Western	122,046	141,439	485	.....	463
Alsace-Lorraine.	958,284	190,021	.....	.....	.....

On July 1 there were in operation in France 47 acid converters, 76 basic converters, 110 open-hearth furnaces, 18 crucibles and 22 electric furnaces. Of the production in the first six months of 1924, 85.7 per cent of the ingots were consumed in producing mills and 14.3 per cent were delivered to other mills.

Semi-Finished and Finished Steel

Of the 2,259,970 tons of semi-finished products turned out (blooms, billets, tin plate, bars, etc.) 74.8 per cent were made by the Thomas process, 0.01 per cent by the Bessemer process, 24.6 per cent was open-hearth, 0.04 per cent was crucible, and 0.55 per cent was made in electric furnaces.

During the first half of 1924, 1,377,767 tons of semi-finished products were consumed by the producing mills and 882,203 tons were delivered to other mills. Of the total output for this period, 736,766 tons was produced in the Eastern district, 836,286 tons in Alsace-Lorraine, 212,414 tons in the North, 169,459 tons in the Center, 22,596 tons in the Southwest, 30,726 tons in the Southeast, and 201,723 tons in the West.

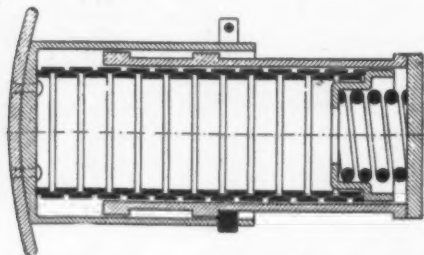
Finished iron and steel products made in France during the first half of 1924 aggregated 2,297,313 metric tons, most of which was merchant bars and special steel bars, structural steel, sheets and rails.

October exports of pig iron from the United States, amounting to 3373 tons, included 2017 tons sent to England, 1202 tons to Canada, 52 tons to Germany, 50 tons to Cuba, 27 tons to Mexico and 25 tons to Colombia.

New Buffer Spring

A new engineering element lately has been introduced with new buffers on the German railroads—a so-called ring spring or friction spring. It consists of a number of rings of triangular section, inside rings with the base of the section triangle toward the center, and outside rings with the base outward, put together alternately. A spring of 6 in. outside diameter and an extended length in the buffer of 21 in. will stop a blow of a force of about 26 tons.

When the spring is pressed together, the inner rings are subjected to pressure and the outer rings to tension. The friction between the rings also acts as a



Section of New Buffer Spring

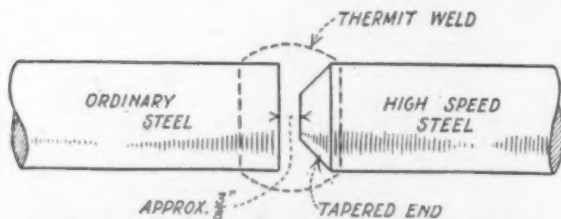
strong brake, as it uses up the greatest part of the energy, so that only about 30 per cent of the original force presses the buffer outward. This is of considerable importance in switching, etc., as the heavy outward jerk caused by the other springs often leads to breakage of couplings. The taper of the rings is about 3 to 10 against the axis of the spring, and the strength of the latter increases by about 60 per cent if pressed together. Undoubtedly springs of this type will be found useful in various other lines of engineering.

The new buffers are also a novelty in substituting, for the center bar and the bracket on buffers of the old type, two tubes which are seamless and manufactured in a combined forging and drawing process.

Welding High-Speed Steel to Ordinary Steel

In using sizers or expanders in connection with making brass tubing, a prominent manufacturer employing these tools to a great extent finds it necessary, to prolong their life, to make them of high-speed steel, thus retaining their hardness at higher temperatures, which ordinarily draw the temper of high-carbon steels.

To reduce the amount of the relatively more expensive high-speed steel in these spindles, it was decided to have bars of high-speed steel Thermit-welded to



Proper Pointing of High-Speed Steel Rod for Welding

ordinary steel bars. A great many of these bars, varying from about 1½ in. to 3¼ in. diameter were, therefore, shipped from time to time to the Jersey City plant of the Metal & Thermit Corporation to be welded.

Considerable difficulty was encountered in this welding work, due to the difference in coefficient of expansion between high-speed and ordinary steel. After welding, an annular hairline shrinkage fracture frequently developed adjacent to the collar of the high-speed steel end. To determine the cause of this trouble and overcome it, many experiments were made in con-

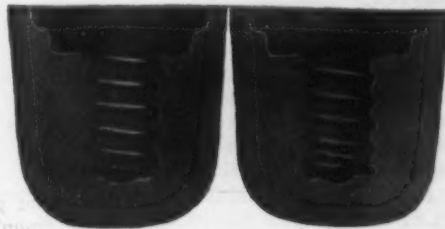
nection with the manner and time of preheating. Finally, all troubles were eliminated by adopting the method of welding shown in the accompanying sketch, which is taken from *Reactions*.

In preparing the high-speed steel piece for welding, its end was shaped in the form of a truncated cone. The diameter of the truncated end was made approximately two-fifths the diameter of the bar. The gap left between the end of the truncated cone and the flat end surface of the machine steel piece was approximately ⅜ in., or slightly less than would ordinarily be the case were the ends flat, as in the usual procedure with welding ordinary steel.

Not a single job made in the above manner cracked. It should be mentioned that all the spindles were reheated after welding, to relieve any strains or stress that might be present due to the difference in coefficient of expansion between high-speed steel and machine steel. This heat treatment is necessary in the case of high-speed steel which is to be subjected to shock after welding.

New Stopper for Pouring Steel

Realizing that the closed end stopper has always offered certain advantages to anyone interested in the careful pouring of steel, the Ross-Tacony Crucible Co., Tacony, Philadelphia, has developed what it considers is the first completely fool-proof stopper ever manufactured. Of the three usual types of stoppers, the screw stopper has usually shown the best results and been the greatest favorite. In the new stopper as illustrated a threaded steel sleeve has been placed inside the clay lining. The rod thus engages the stopper with a thread which offers a positive hold and which cannot be broken or weakened through strain, set up by rough handling, poorly fitting rod ends or by sharp pieces of slag remaining thereon. The new stopper, which is



A Steel-Shod, Clay-Lined Graphite Stopper

called the Ross steel-shod, clay-lined, graphite stopper, is fully patented and is offered with a standard thread for 1½-in. rod ends, ⅜-in. pitch.

Melt of Ohio's Foundries Increased

The Ohio State Foundrymen's Association, Cleveland, reports that operations for October of foundries in that State show a very satisfactory increase. The figures for October indicate an actual melt of 64.5 per cent of capacity or normal. This is exactly 10 per cent better than September operations and nearly as high as October, last year, which stood at 68.14 per cent.

Stocks on hand show a little increase, October standing at 85 per cent. September stood at 83 per cent and October, last year, 77 per cent. Stocks received increased to 52 per cent. September stood at 41 per cent and October, one year ago, at 52 per cent also.

United States imports in the 10 months ended Oct. 31 were \$2,981,000,000 in 1924, compared with \$3,212,000,000 in 1923. Exports during the same period are reported at \$3,652,000,000 in 1924 and \$3,339,000,000 in 1923. The so-called "favorable balance of trade" amounted in 10 months of 1924 to \$671,000,000, compared with only \$127,000,000 in 1923.

FRENCH FOUNDRY CONGRESS

Special Pig Iron Low in Carbon—Foundry Sands and Simple Tests for Quality

(Special Correspondence)

PARIS, FRANCE, Nov. 27.—The fourth annual foundry congress, organized by the Association Technique de Fonderie, was opened in this city on Nov. 21. There were five sessions, each one devoted to a special topic.

Special Pig Iron

An important paper at the first session, which was devoted to the utilization of special pig irons, was one by M. Roehrich, entitled "Special Pig Irons from Hagondange Iron Works." The author described a new process developed at the Hagondange works in Lorraine, which claims that it is in a position to supply 20 tons at a time of perfectly homogeneous pig iron made in converters of a composition suited to the consumers' requirements. Low carbon pig iron has been obtained by this process, said the author, that cannot be made in a blast furnace. He pointed to the fact that the Société Alsacienne des Pontes Mécaniques has used some of this pig iron under the name of "fonte aciérie" for rolls for rolling mills and that the Renault plant has used some of the "semi-phosphorus" pig iron made by the same process for cylinders for motor cars.

Two other papers contributed at this session were entitled "Some of the Factors Which Influence the Resistance of Pig Iron" by A. Campion, Glasgow, Scotland, submitted on behalf of the Institute of British Foundrymen, and one entitled "Mechanical Characteristics of Special Pig Irons" by Jacques Varlet, foundry foreman of the Société Métallurgique d'Espérance Longdoz at Seraing, Belgium, submitted on behalf of the Association Technique de Fonderie de Belgique.

Foundry Sands

The second session was devoted to "Scientific and Experimental Study of Sand." In a paper entitled "Review of Physical Characteristics of Sands in Foundry Practice," by L. Deltour, engineer, the following points were considered: Deformation, cohesion and adhesion and also plasticity, in the restricted meaning of that word. The author enumerated the following principal theories bearing on plasticity: 1.—Physical phenomenon of suspension. 2.—Excess of water saturating the capillary ducts of sand and enveloping the surface. 3.—Lamellar structure of sand particles.

On behalf of the American Foundrymen's Association, a paper entitled "Influence of Moisture, Dust and Clay on the Permeability of Foundry Sands" was contributed by Messrs. Harrington, MacColomb and Hosmer, of the Hunts-Spiller Mfg. Co., Boston. The authors described their own experiments using methods suggested by the committee on the testing of sands of the American Foundrymen's Association. The experiments were applied to sands ready for use, namely, spent sands regenerated by new sands. The experiments continued 19 days and the authors stated that the results seemed to confirm the theory that if the contents in moisture, dust and clay matter exceed a certain limit, a decrease of permeability results. Their conclusions are in favor of the methods of the American Foundrymen's Association.

Chemical Analyses and Sand

M. Gramme, director of the laboratory of the Société Française de Construction Babcock & Wilcox, delivered a paper on "An Industrial Study of Foundry Sands." The author declared that chemical analysis furnishes at the present time the only available indication of the quality of sands, but it gives no information as to the mutual behavior of the various elements constituting them. He believed that a process of sand separation will be more useful and recommended the following: A test tube 50 cm. high, having a diameter of 18 to 20 cm., is filled with 10 gr. of sand; 10 cc. of hydrochloric acid are added and the contents shaken. Following this 15 cc. of alcohol are poured in, followed by another shaking. Finally, the tube is filled with fresh water and shaken again for

two or three minutes. This enables a study of the sand as to the size of the particles, their chemical content and physical analysis. The author concluded his paper by giving his opinion of foundry sands in general.

M. Formel, professor in the Ecole Supérieure de Fonderie, suggested that a research be started to ascertain when and under what conditions sand is lacking in colloidal constituents which alone are essential, and M. Sallet, foundry engineer, took as his subject quality of sands used in foundry work. He drew the attention of the congress to the utilization of dry sands which demand the use of relatively large additions of water and that, if heavy sands are to be used, they must be very dry.

Simple Test for Sand

M. Pascal, engineer of the Arts et Métiers, contributed a report on "Testing, Treatment and Utilization of Foundry Sands" and recommended:

- 1.—Chemical analysis of the product dried at 110 deg.
- 2.—Exact determination of the proportion of sand and clay content in the product.
- 3.—Chemical analysis of the argillaceous matter.

A simplified method for testing foundry sands was contributed by A. Taufflieb, consulting engineer. He described a method which needs no laboratory or chemist and which can be carried out on the corner of a desk with simple apparatus. The sample is taken in a graduated cylinder, the sand being put in loosely. Its permeability is gaged by the time consumed for a certain volume of air to filter through the sand in the cylinder. Its resistance is measured by a pair of scales, one of the pans of which has a spherical bottom which sinks into the cylinder filled with sand, compressing it more and more according to the weight of small shot loaded on to it. The test is applicable both to spent sands and to fresh ones.

The third session, which was presided over by M. Damour, vice-president of the Association Technique de Fonderie, was devoted to the subject of "Defects in the Foundry." Some of the papers presented at this session were: "Blow Holes in Cold Iron," by M. Devaux, engineer of the Foundry High School; "A Few Experiments on the Welding of Core Chaplets" by M. Mazenot, and "Comparative Studies in the Foundry," by M. Fleury.

The fourth and fifth sessions were devoted respectively to the subjects of standardization of patterns and costs.

Ore Handling Bridge Contracts Awarded at Lorain

LORAIN, OHIO, Dec. 8.—Contracts for the erection of two modern ore-handling bridges have been awarded to replace equipment destroyed in the tornado of June 28. The National Tube Co. let a contract for an ore bridge for its Lorain plant to the Brown Hoisting Machinery Co., Cleveland. It will take the place of a bridge erected in 1904.

The Baltimore & Ohio Railroad has let a contract for a new ore bridge for its docks at Lorain to Hyle & Patterson, Pittsburgh. The B. & O. bridge, which was destroyed, had been in service 13 years. Part of this old bridge will be used in building the new, but the National Tube bridge will be entirely new.

No Revision of Action as to Range Boilers

WASHINGTON, Dec. 9.—Unanimous decision that there should be no revision at this time of the simplification program adopted six months ago at a general conference was reached yesterday at a meeting of manufacturers, distributors and consumers of range boilers. The meeting was under the auspices of the Division of Simplified Practice, Department of Commerce. The general conference of six months ago reduced the number of range boiler varieties from 130 to 13, and standardized the openings for range boilers. It was reported by some of those present at the meeting yesterday that the progress made through mass production methods had been of the utmost benefit.

HIGHER PRICES POSSIBLE

Youngstown Manufacturers Consider Marking Up Quotations

YOUNGSTOWN, Dec. 9.—A number of significant developments mark the iron and steel markets in this territory. Prominent among them is a possible advance in steel prices above current levels, such action being discussed in industrial circles. Prevailing quotations in rolled steel products, representing an advance on first quarter business of from \$2 to \$3 per ton, are being firmly maintained, with the exception of sheets.

While sheet mills have been enabled the past few weeks to build up backlogs, nevertheless there has been much competition for going business, and not all makers participated in the price advance to the extent that the market has become stabilized at the higher quotations, represented by a 3.60c. per lb. quotation on black sheets, No. 28 gage, Pittsburgh.

In black, blue annealed and galvanized sheets, some makers have been accepting business at the old levels, but this practice is being gradually discontinued, as producers are filling up their order books.

The merchant steel bar market has benefited materially from the current buying movement, while releases against existing contracts have been issued for substantial tonnages. In consequence, production is

now much larger and more sustained than at any time this year, with the exception of the first two months. Large consuming interests are receiving preferential consideration at 2c. per lb., which is being firmly held, while prices up to 2.10c. are being quoted on some inquiries. That the merchant bar market is headed toward a 2.25c. per lb. base, Pittsburgh, is being predicted.

There is somewhat more active demand for steel plates at 1.90c. per lb., Pittsburgh, although the activity in this market is still relatively less than in other finished steel lines.

In the pig iron market, buying has again shown stronger tendencies, following a lull. Interests which were thought to have covered on their first quarter requirements by purchases immediately following the national election, are again in the market at current prices ruling about \$2 per ton higher than when they bought previously.

At that time some buyers, it is felt, under-estimated the strength of the business recovery and their requirements, and are now placing orders for supplemental tonnages.

One recent sale of 1000 tons of sheet bars by a Valley producer, for delivery over December and into January, was made at \$37. This market has been well stabilized for some time, but advanced quotations are considered in order.

IMPROVEMENT IN CANADA

Greater Activity of Iron and Steel in the United States Affects Conditions Across the Border

TORONTO, Dec. 4.—After a quiet period that has existed for three or four months, the Canadian iron and steel industry is beginning to show signs of improvement. Mills at Sault Ste. Marie, Ont., and at Sydney, N. S., which had been closed down for some time, are again in operation in a small way. The Algoma Steel Corporation, Sault Ste. Marie, Ont., within the past two weeks started operations in its 18-in. mill, which is being operated in addition to its 12-in. merchant mill. The British Empire Steel Corporation, Sydney, N. S., about the same time started its blooming mill and two open-hearth furnaces, but it is said that these will continue in operation only until orders for about 2500 tons of steel have been run off and stocks replenished. The British Empire Steel Corporation recently received orders for 1300 tons of wire nails from Western Canada; and is bidding on a 30,000-ton rail order for New Zealand. During recent months the British Empire Steel Corporation has become a strong competitor for business in the Ontario market and has closed several large tonnage orders for steel bars, in addition to having shipped several cargoes of pig iron into this district. General improvement is reported in black and galvanized sheet sales. In order to give more attention and supply larger quantities of sheets to the Canadian trade, both the Baldwins, Montreal, Ltd., and the Dominion Sheet Metal Corporation, Hamilton, Ont., are preparing to locate large plants in Montreal, Que., for the production of galvanized sheets. Both the above mentioned concerns will be operated as subsidiaries of large British manufacturing companies.

Within the past week or two, general improvement in demand has featured the Canadian pig iron market. Melters had been withholding contracts on first quarter account, but the improved conditions reported in the United States since the Presidential elections, together with the fact that prices across the line have been advancing, resulted in a more active buying movement by Canadian consumers. On Nov. 21, Canadian blast furnace operators advanced their pig iron price \$1 per ton, in both Toronto and Montreal markets, and while a few melters made provision for first quarter before the advance became effective the majority were not so fortunate, but as predictions of still higher prices are being made contracts for first quarter iron are appearing in large numbers.

Local blast furnace representatives say that present conditions across the line and in this country warrant a further advance in prices, and as a result iron and steel interests are watching with keen interest for higher prices which are expected to go into effect almost any day. The new prices, which went into effect Nov. 21, are as follows: No. 1 (2.25 to 2.75 silicon), \$26.30; malleable, \$26.30; No. 2 (1.75 to 2.25 silicon), \$25.80, Toronto. As a consequence of the difference in freight charges between Toronto and Montreal, prices in the latter district are as follows: No. 1 (2.25 to 2.75 silicon), \$28.70; malleable, \$28.70; No. 2 (1.75 to 2.25 silicon), \$28.20.

Lake Superior Iron Ore Shipments by Water for the Year

CLEVELAND, Dec. 8.—Iron ore shipments by water from the Lake Superior district during 1924 were 42,623,572 gross tons. Shipments during December amounted to only 8906 tons. The movement for the season, therefore, shows a decrease of 16,412,503 tons, or 27.8 per cent, from 1923, when the total was 59,036,075 tons. The 1924 movement is only a little larger than that in 1922, when the total was 42,613,229 tons. The peak was reached in 1916, when the total was 64,734,198 tons, the 61,000,000-ton mark having been passed in both the following years. In 1919 the shipments dropped back to 47,177,395 tons, but it climbed to 58,527,226 tons in 1920. In the lean year of 1921 it fell to 22,300,726 tons.

The following table gives the season's shipments by ports in gross tons and the corresponding figures for 1923:

	Season, 1924	Season, 1923
Escanaba	4,244,669	5,607,411
Marquette	2,516,548	2,789,285
Ashland	4,807,565	6,287,449
Superior	13,355,214	17,820,476
Duluth	12,882,082	20,163,619
Two Harbors	4,817,494	6,418,464
Total	42,623,572	59,036,704
1924 decrease	16,412,503	

The new sheet mills recently completed at the Brier Hill works of the Youngstown Sheet & Tube Co., Youngstown, referred to in THE IRON AGE of Nov. 27, page 1410, were built by the United Engineering & Foundry Co., Pittsburgh, and much of the equipment was installed by that company.

Hopeful View in Great Britain

Market Marking Time Until Turn of Year—

Tin Plate Output May Be Regulated—

German Steel Output Curtailment

Extended Through January

(By Cable)

LONDON, ENGLAND, Dec. 9.

BUSINESS in Cleveland pig iron is duller on account of the approaching end of the year, but current output is readily absorbed. A hopeful view is taken of the future. There are some indications of better Continental demand, and blowing in of fur-

sally are dull. Makers, meanwhile, are maintaining a firm attitude.

The London, Midland & Scottish Railway and the London and North Eastern Railway now are allocating orders totaling 5000 wagons (freight cars) among British works. The London & North Eastern is to spend £6,000,000 (\$28,200,000) sterling next year on locomotives and rolling stock.

Sheets and Tin Plate

Tin plate is quiet; domestic and export markets are dull. Decisions may be taken shortly on the question of curtailment of output. A majority of the makers are believed to favor this step.

Galvanized sheet markets are firm. Business is only moderate. Makers of thick gages are booked up for some weeks ahead.

British and Continental prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.70 per £1, as follows:

Durham coke, del'd..	£1 5s.		\$5.88	
Bilbao Rubio ore†...	1 4		5.64	
Cleveland No. 1 fdy..	4 6	to £4 7s.	20.21	to \$20.45
Cleveland No. 3 fdy..	4 1½	to 4 2	19.15	to 19.27
Cleveland No. 4 fdy..	4 1		19.04	
Cleveland No. 4 forge	4 0		18.80	
Cleveland basic	4 0		18.80	
East Coast mixed....	4 8½	to 4 9	20.80	to 20.92
East Coast hematite..	4 19	to 5 0	23.27	to 23.50
Ferromanganese	14 0	to 14 15	65.80	to 69.33
*Ferromanganese	14 0	to 14 15	65.80	to 69.33
Rails, 60 lb. and up..	8 10	to 9 0	39.95	to 42.30
Billets	7 5	to 8 0	34.08	to 37.60
Sheet and tin plate				
bars, Welsh	8 7½		39.39	
Tin plates, base box..	1 3½		5.52	
			C. per Lb.	
Ship plates	9 0	to 9 10	1.89	to 1.99
Boiler plates	13 0	to 13 10	2.73	to 2.83
Tees	9 2½	to 9 12½	1.91	to 2.02
Channels	8 7½	to 8 17½	1.76	to 1.86
Beams	8 2½	to 8 12½	1.70	to 1.81
Round bars, ¾ to 3 in.	9 7½	to 9 17½	1.97	to 1.07
Galv. sheets, 24 gage	17 10		3.67	
Black sheets, 24 gage	12 10	to 12 15	2.62	to 2.68
Black sheets, Japanese				
specifications	15 5		3.20	
Steel hoops	10 15	and 12 10*	2.26	and 2.62*
Cold rolled steel strip,				
20 gage	16 0		3.36	

*Export price.

†Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

Foundry pig iron:(a)			
Belgium	£3 16s.		\$17.86
France	3 16		17.86
Luxemburg	3 16		17.86
Basic pig iron:(a)			
Belgium	3 14		17.39
France	3 14		17.39
Luxemburg	3 14		17.39
Billets:			
Belgium	5 5 and upward		24.68
France	5 5 and upward		24.68
Merchant bars:			C. per Lb.
Belgium	6 0		1.26
Luxemburg	6 0		1.26
France	6 0		1.26
Joists (beams):			
Belgium	5 15		1.21
Luxemburg	5 15		1.21
France	5 15		1.21
Angles:			
Belgium	8 0	to £8 5s.	1.68 to 1.73
½-in. plates:			
Belgium	7 0		1.47
Germany	7 0		1.47
¾-in. ship plates:			
Luxemburg	7 0		1.47
Belgium	7 0		1.47

(a) Nominal.

ther furnaces is talked of. Hematite stocks now are greatly reduced, and the position is much healthier. Dear fuel hampers expansion of output.

Buyers of foreign ore so far are unwilling to follow the slightly firmer tendency in prices, though increased buying capacity certainly is in evidence. Best Bilbao Rubio is quoted at 22s. 6d. to 22s. 9d. (\$5.29 to \$5.34) ex-ship Tees. Some sellers are asking more.

Finished iron and steel are quiet. No noteworthy revival is deemed possible until the new year. There is some inquiry for shipbuilding material, but little business so far has resulted. Export markets univer-

sally are dull. Makers, meanwhile, are maintaining a firm attitude.

On the Continent of Europe

Continental markets are erratic. Some makers are sold out. Others are able to deliver promptly. The undertone is easier on slackening demand. Merchant bars are weak at £6 (1.26c. per lb.) f.o.b. Joists (beams) are easier at £5 15s. (1.21c.).

The German raw steel syndicate has ordered a continuance of the 20 per cent curtailment in output during January.

Coal and Coke Companies at Birmingham, Ala., Are Merged

BIRMINGHAM, ALA., Dec. 8.—Merger of the Pratt Consolidated Coal Co., the largest independent coal producing company in Alabama, and the Alabama By-Products Corporation, a coal and coke producing company, has been completed. Following statement was made by M. W. Bush, president:

The merger of the properties and business of the Pratt Consolidated Coal Co. with that of the Alabama By-Products Corporation has been completed and the business will be carried on under the name of the Alabama By-Products Corporation, the directors of which are M. W. Bush, H. Ham-

mond, A. P. Bush, H. L. Morrow, G. B. McCormack, Erskine Ramsay and Carr McCormack. The officers are G. B. McCormack, chairman of the board of directors; Morris W. Bush, president; Horace Hammond, vice-president; A. P. Bush, vice-president; H. L. Morrow, treasurer; J. A. Shock, secretary and H. M. Cowart, assistant secretary and assistant treasurer.

The company has ample cash working capital not only sufficient for its current business but amply sufficient for the completion of all additions and improvements now under way and those contemplated in the near future.

The Alabama By-Products Corporation is now building 25 additional ovens to its plant at Tarrant City—just outside of the city of Birmingham, the ovens to be completed by March 1.

THE 1924 POWER SHOW

Space and Attendance Greater Than Last Year's— Over 370 Exhibits

More than 370 manufacturers of power plant and accessory equipment were represented at the third National Exposition of Power and Mechanical Engineering held at the Grand Central Palace, New York, Dec. 1 to 6, simultaneously with the forty-fifth annual meeting of the American Society of Mechanical Engineers. At last year's exposition there were 260 exhibitors, the increase being therefore more than 100. The floor space occupied by the exhibits was 150,000 sq. ft., which is approximately one-fourth more than last year. The attendance is estimated to have been in excess of 60,000.

Working models of apparatus, full size units and cut-away models, showing interior construction were on view. Manufacturers of Diesel engines, turbines and boilers were represented. Oil-burning equipment of both steam and mechanical atomizing type was shown and there were several exhibits of pulverized coal equipment. A number of companies showed hand and mechanically operated stokers, many of them demonstrating from actual units. The showing of grates, grate bars, refractory brick, bonding cement and boiler arches was large. Models of coal and ash handling machinery formed an interesting part of the exposition as a whole. Various makes of radiant heat

superheaters, economizers, air preheaters, condensers and cooling towers were exhibited, models of the latter being shown in operation. There were also showings of steam jet, hot well and vacuum pumps.

Boiler room instrument exhibits were numerous, both indicating and recording instruments being demonstrated. The showing of valves was extensive and included many motor-controlled units. Steam traps, pump governors, water regulators and damper regulators were on view.

There were attractive displays by manufacturers of ball and roller bearings, and several designs of flexible couplings were shown. Gears, speed reducing mechanisms, silent chain, belting, shaft hangers and other transmission equipment were exhibited. Several companies displayed condenser tubes and brass and copper pipe. A few machine tools were shown and there was an exhibit of electric trucks for industrial purposes.

A historical exhibit showing the development of machine tools was made by the National Museum of Engineering. A Howe plain milling machine, built by the Robbins & Lawrence Co., Windsor, Vt., in 1848, was on view, as well as the first measuring machine using linear graduations, built by the Brown & Sharpe Mfg. Co. in 1878. There were also other educational exhibits, and technical lectures on a variety of subjects were a feature as heretofore. Several motion pictures of general engineering and industrial interest were shown.

Labor Conditions Satisfactory in the Youngstown District

YOUNGSTOWN, Dec. 9.—Employment conditions are regarded in this district as satisfactory. With the increase in steel property operations, large numbers of additional workmen have been taken on within the past month and a half, while men who worked intermittently and irregularly for some time are now securing regular employment.

Workers of course appreciate the improved conditions benefiting the steel industry and the likelihood of steadier employment next year than prevailed during 1924. The recent statement by President James A. Campbell of the Youngstown Sheet & Tube Co. that no wage reductions are in contemplation was received with much satisfaction by employees throughout this territory.

In this district, it is considered unlikely that the movement to further organize iron and steel workers will make much headway, because of the experiences of the past in this direction. What workers in the industry apparently desire more than anything else is steady employment at remunerative rates of compensation, and in many cases longer working hours.

Donner Steel Co. Reduces Accidents

BUFFALO, Dec. 9.—The Donner Steel Co. has made what is believed to constitute a record in the steel industry in the matter of reducing accidents. In the first 11 months of 1924, the frequency of accidents was reduced 71.4 per cent, and the cost of compensation was reduced 68 per cent, compared with the record of 1923. These facts were brought out at a meeting Dec. 6 in the Hotel Lafayette, of the company's Safety Council.

Martin H. Stearns, safety engineer, in outlining the accomplishments of the past year, asked the members of the council to continue their commendable work of the last two years. He said that the system adopted by the Donner company has proved successful and soon will be practised by every industrial plant. The Donner Safety Council was formed in 1922 when the high accident mark was reached. A man was chosen from each department to serve a term of three months on the council board. Investigations of safety conditions at the plant were begun and suggestions and plans submitted to the plant management. Every possible modern safety device was installed.

New Products Shown During Sales Convention of Fairbanks, Morse & Co.

New products, sales plans and production methods were studied by branch managers, general office and factory executives of Fairbanks, Morse & Co., Chicago, during a sales convention held by that company the week of Dec. 1. The conference was called at the executive offices at Chicago, the party of 52 subsequently visiting the company's electrical machinery plant at Indianapolis, its pump factory at Three Rivers, Mich., and its engine plant at Beloit, Wis.

Production methods employed in the manufacture of electrical machinery were inspected at the Indianapolis plant. The new hydraulic testing department at the Three Rivers, Mich., plant was a feature of interest. One of the pumps seen in operation was a 36-in. 40,000 gal. per min. centrifugal unit for connection to a 300 hp. engine, and which will be installed for reclamation service in the Southwest. A high-speed ball-bearing pump and motor unit was also under test at this plant. The pump, which is rated at 325 gal. per min. against a 234 ft. head, is said to have developed an efficiency of 74.5 per cent.

At the Beloit Works production methods have been extensively revised, and the inspection trip to that plant proved of much interest. The conveyor system of assembly has been carried out to unusual refinement. Farm light plants, pumping plants and other lines are completely assembled from moving conveyors, and all stores supplies are moved on supplementary conveyors, which are timed to deliver the parts as needed in the assembly. The absence of trucking in the plant is a noticeable feature. Among new products developed is a line of high-speed reciprocating pump and a totally inclosed concrete mixer engine. Another development is a vertical Diesel engine for marine and stationary service, in ratings from 36 to 300 hp. This engine is similar to the company's type Y and CO engines except for additional refinements. These engines start without aid of auxiliary ignition devices.

The National Association of Brass Manufacturers will hold its annual meeting at the Hotel Astor, New York, Thursday, Dec. 11. At a luncheon to delegates and guests, an address will be made by D. F. Grant, president of the Chamber of Commerce of the United States.

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ESTABLISHED 1855

THE IRON AGE

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The Economic Outlook

NOT for a long time have the business forecasters been so unqualifiedly optimistic as they are at present. Judge Gary predicts the early operation of the steel industry at full capacity and is glad that wages were not reduced during the recent depression. Secretary Hoover has expressed himself to the effect that the time has come when we may safely consider investment of money in new enterprises rather than merely for repair work. Charles M. Schwab says that business in general will experience greater prosperity in the future than in any previous years, adding: "If you have capital to invest in industry, do not hesitate. We are assured of a safe and sane government and the future of this country offers greater opportunity than at any other period. Endowed as it is with incomparable resources, this country is going to be the workshop of the world."

All of this is pleasant advice, but what of the basis for it? We have had an important change in our political outlook, but has there been any in the economic fundamentals? Has sufficient distinction been made between the prospect for industrial activity and economic prosperity? Perhaps for the lifetime of the present generation that does not matter, while it may matter to the generation that will follow. These conditions should be examined.

The real questions are, What percentage of our people is going to work productively, what percentage is going to work full time, and what percentage is going to be diverted to governmental service; and to what extent will engineering and management dispense with the need for men and set them free for governmental service or the enjoyment of leisure? These are our economic fundamentals. Yet amid the great mass of statistics we have at the present time there are none that illuminate them directly and but few that do so indirectly.

We are diverting the labor of about one-eighth of our workers to the purposes of government, a

much larger percentage than before the war. Many of these purposes are indispensable; many of them are otherwise. All of them are fulfilled in a wasteful way. Whether dispensable or indispensable, none of them is directly productive of goods.

We are diverting another large part of our labor to the production of pleasure-giving goods, whereof the manufacture of automobiles and the things with which to operate them is the most important example. This diversion includes not only the men who are directly employed in manufacture, merchandising and operating, but also those who produce the steel, copper, glass, etc., that are required. Considering that automobile manufacture directly consumes 10 per cent of our steel, 15 per cent of our copper, and similarly as to many other commodities, the aggregate of this diversion of labor must be very great.

In the face of these great diversions we are reducing working hours per week, and by virtue of increasing holidays and vacations are reducing the working hours per annum in even greater proportion. This is a direct diminisher of production. In machine production output is a direct function of time. It is only in exceptional instances that reduction of work hours from ten to eight results in the same output by virtue of speeding up.

A good many industries are overmanned in order to be able to handle peak loads. The variation in the employment of railroad labor is well known. Building does not go on regularly, owing to seasonal conditions. Other industries are never able to afford full annual employment to the entire personnel that is attached to them, the production of bituminous coal and the making of boots and shoes being noteworthy examples. Finally, there is a proportion of our able-bodied that is habitually idle. We have no certain means of knowing whether the waste of time in these several ways has increased in recent years. We conjecture that it has to some extent; but this is purely conjecture.

Some other conditions are even more difficult of estimation. The soil of our farms is steadily being exhausted, our mines are becoming deeper, our forests are being denuded, constraining us to bring our lumber from greater distances. Such things imply the need for the work of more men to make a unit of production. On the other hand, engineering and management are constantly substituting machines for men or rearranging operations so that fewer men are required to produce a given result. Important things have been accomplished in these ways in the last five years. Some distinguished persons assert that these have more than outweighed the conditions of lessening work. It is to be doubted that such a result could have been achieved in so short a time. Our statistics of production in the aggregate do not so indicate.

Indeed, evidence to the contrary is to be found in our high taxes and high prices. High taxes reflect the diversion of labor to purposes of government. High prices reflect inadequate production of commodities.

Now it may be that an increased percentage of our population has to be supported while performing government work, while providing for our pleasures, or while loafing; nevertheless it must be fed and clothed and housed. The mere fulfillment of such needs by a population of 112 million that is growing all the time is bound to produce great industrial activity. Unbalances may cause that to be more intense in some lines than in others. Similarly profits will vary; and even in the lines of intense activity they will be curtailed by economic maladjustments and by the slices that the tax-gatherer takes. There is implied simply the need for discrimination between those industries that have favorable prospects and those that have not.

Nor are the prophecies of the pessimists to be disregarded. The diversion of labor to unproductive work and the relaxation by labor are destined to develop troubles. Our industrial activity may be too much for pleasurable high-living and not enough for the production of capital goods, which is to say that we may be eating our cake as we go along and not putting anything aside for the coming generation. In our great and rich country, however, it may be a long time—many years—before the consequences of such conditions become acute. In the meanwhile it is well enough to bow to the judgment of the optimists and swim with the tide.

The stock market has been trying to tell us these things in a crude, even incoherent way. We can see much justification for the rise in securities that has occurred. We can see with Judge Gary that the requirements of automobile manufacture, railroad upkeep, the petroleum industry, building needs, etc., may lead to full-scale operation of our steel plants. We can not see with Mr. Hoover how we can undertake constructive enterprises unless we become thrifty and have labor and material to spare for them. We can not see with Mr. Schwab how America can become the workshop of the world and sell freely to the people of foreign countries unless we are to buy freely of their goods.

Production in 1924

PRODUCTION in the calendar year now closing may be estimated at 31,100,000 tons in pig iron and 36,250,000 tons in steel ingots. By comparison with last year, the figures represent a decrease of 23 per cent in pig iron and 17 per cent in ingots. By comparison with the average of the five years preceding, there are increases of 2 per cent in pig iron and 6 per cent in ingots.

Thus the usual comparison, of contiguous years, makes this year appear a poor one, while comparison with an average brings out a better showing. Even if it is assumed, however, that the five-year average is a proper basis for comparison, the gains over the average are not in keeping with the traditions of the iron and steel industry, because from the center of the five-year period to the center of 1924 is three years. At a rate of doubling in ten years, a 23 per cent gain would be shown in three years. Even at a rate of doubling in as long as 20 years an 11 per cent gain would be due for three years.

Thus there has been no striking change lately in tonnage. The six years that have elapsed since the war may be regarded as a period. With the more settled conditions we now have in the United States, and with the new outlook there is for Europe, we may be about to enter upon a different period. How bad or good this past period of six years has been may furnish some suggestion as to what we may hope for in coming years. A comparison of tonnages in the six years ending with 1924 and the six years ended with 1914 becomes of interest. The comparison of average production per annum is as follows:

Average, Six Years Ended	Pig Iron, Gross Tons	Steel Ingots, Gross Tons
1914	27,280,000	25,810,000
1924	30,550,000	34,680,000
Increase	12%	34%

In the old years we used to have a doubling in pig iron in an average period of about ten years. As steel was supplanting wrought iron and to an extent taking the place of iron castings there was sometimes an even more rapid increase in steel tonnage than a ten-year doubling. The ten-year gain shown above is therefore very poor. The figures confirm the view that the war set things back, or arrested progress.

The fond notion put forth at the close of the war that there was a "shortage" to be made up is, of course, quite illusive. It is not a shortage in supplies but a shortage in progress. The time lost cannot be made up. What can occur, however, is a resumption of the world's progress. The world cannot catch up so that in 1934 it will be where it would have been had there been no war, but it can resume its old rate of progress. We may expect a period ending 1934 to show a greater gain over the period ending 1924 than the period ending 1924 does over the six-year period 1909-1914.

THE ferromanganese industry again presents the puzzle that was a subject of comment about a year ago—more manganese alloy being produced than high-grade ore receipts justify. To Oct. 1 there has been imported this year 204,600 gross tons of manganese ore, theoretically

enough to produce about 81,800 tons of ferromanganese. But in the same period over 162,400 tons of ferromanganese has been made in the United States, requiring about 406,000 tons of ore. In other words, only about 50 per cent of the necessary ore has been imported this year. A similar discrepancy last year was explained by large stocks of ore carried over from previous years. But it is obvious that this explanation has its limitations as time runs on, and a question is raised as to the correctness of the published Government data as to the amount of manganese ore unloaded at North American ports. It is still the fact, in spite of all the claims made when a high duty was imposed on manganese ore, that there is no appreciable production of high-grade manganese ore at mines in the United States.

The Graduated Income Tax

EVERYONE is familiar with our system of surtaxes, which causes those of large income to pay proportionately much more than those of small income. The controversy in Congress last spring over Mr. Mellon's program for tax revision focused on that very thing. The discussions at that time, however, were largely in the abstract. The recent publication of income tax returns has given to the question a more personal and human interest. It has helped people to visualize conditions and has dramatized a situation.

Everybody has seen just how many millions is paid to the Government by Henry Ford; how many by John D. Rockefeller, Jr. In each instance their payments represent incomes so enormous that the subtraction of a large part of them is immaterial to either of these men. What remains is far in excess of their personal needs, even if the latter were most extravagant. What then is the difference as to what may become of such surplus incomes?

If Mr. Ford were allowed to retain all of his, he would probably use it for further industrial expansions which would increase the production of commodities and would give employment to more men. Mr. Rockefeller, on the other hand, would have more means wherewith to endow scientific research and thus benefit everybody. These men are merely picturesque examples. What is true of them is true of many of much smaller incomes. The maximum that an ordinary wealthy family can spend on its own living and enjoyment is limited unless it indulges in exceptional extravagances, such as steam yachts, racing stables, theatrical ventures, or something of those sorts. In the main, however, earned surpluses go back into industry.

When the Government takes these surpluses, industry is deprived of just so much. This produces multifold evils. The ease with which the Government can put its hand upon such resources promotes governmental extravagance. Citizens who are relieved of the burden of taxation that otherwise they should bear, perhaps escaping it entirely, have more means for their private extravagances. Either way there is waste. What is equally bad is the development of the immorality

of citizens enjoying the benefit of government and paying nothing for it.

Theoretically there is much to be said in favor of a consumption tax whereof the incidence would be upon what a man spends, not upon what he earns. If such a tax were applied upon a rising scale, it would have the direct effect of penalizing extravagance and preserving for the general good the maximum of savings. Such a form of taxation is, however, difficult to systematize. At present we have some consumption taxes, some excise taxes, some direct taxes on property and income taxes superimposed upon all of them. We do not expect that the income taxes that have been saddled upon us will be removed within any time that we can foresee, but it is not too much to hope that a less galling form of saddle may be substituted.

President Coolidge did well, in spite of the deaf ear turned to the argument by the present Congress, to say again in his message that the effect of the present surtaxes is "to increase the cost of interest on productive enterprise and to increase the burden of rent." The truth should be continually reiterated that the present system of surtaxing large incomes, based on the fallacy that the costs of government are and should be borne by the rich, actually operates against the best interests of the great majority of the people.

British and American Prices

AN editorial in *Iron and Coal Trades Review*, London, directs attention to the fact that steel prices in Great Britain are much lower relative to commodities in general than in the year 1913, which abroad as well as in the United States is taken as typical of pre-war conditions. While the general standard for Britain is taken at 80 per cent above 1913, or "pre-war," the London journal computes the increases in iron and steel over 1913 as follows:

	Per Cent Increase
Cleveland pig iron.....	67
Rails	38
Joists	39
Plates	44
Galvanized sheets.....	60

Probably the average of all steel prices in Britain is about 45 per cent above 1913, or only a trifle more than half the increase in commodities in general. The London journal points out that wages in the iron and steel industry have been adjusted in accordance with the state of prosperity in the industry, which has been far from a high one, but that there is no control over coke, the cost of which is high on account of the coal miners insisting on short working shifts with high wages. This is seen to work out in the 67 per cent increase in pig iron, against so much less in steel.

In the United States this arrangement is reversed. Our pig iron prices now are about 40 per cent above 1913, while our finished steel runs about 56 per cent above 1913. We also have a high union coal mining scale, but we have much non-union capacity, and the bulk of the coke used at merchant furnaces and of coal used at by-product ovens is based upon the lower rather than the higher wages.

While in Britain steel prices are low relative to the general price level, say 45 per cent advance over 1913 in steel and 80 per cent in commodities, our steel prices represent approximately the same advance over 1913 as do commodities in general. The bare statistical comparison shows a few points difference, since the last commodity index of the Bureau of Labor was 152, but the abolition of the Pittsburgh Plus system would go far toward absorbing this difference.

As it is said that wages in the British iron and steel industry have been related to the depressed condition of the industry rather than to the cost of living, the augury for the future is that if the British iron and steel industry becomes prosperous its costs will increase. In the United States we do not definitely expect an increase. Our costs are rather high at the present time. If there is a larger steel demand from the non-producing countries, the British trade should be helped and business should overflow to the United States. The French, German and Belgian industries will, of course, endeavor to take a share. Recently there was an interesting experience in tin plate, the competition in which is practically confined to Britain and the United States. The British mills became comfortably filled, and export prices advanced about \$5 a ton.

CORRESPONDENCE

Against State Income Taxes

To the Editor: Oregon repealed the State income tax law at the general election of Nov. 4 by a majority of a little more than 12,000 votes. This law had been passed by the 1923 Legislature, and was sustained by a bare majority in a referendum in November, 1923.

Oregon is the only State in the Union that has ever repealed a State income tax. The business interests in general are very proud of this achievement, especially as the repeal was strongly contested by a class that cares little about the progress of a community.

OREGON BRASS WORKS,

W. F. Prier, President.

Portland, Ore., Dec. 2.

[At the same election Florida voters by a very large majority adopted a constitutional amendment providing that no income tax or inheritance tax shall ever be imposed in that State.—EDITOR.]

Are There Too Many Technical Papers?

To the Editor: Answering the question, "Are There Too Many Technical Papers?" raised in an editorial in THE IRON AGE, Nov. 27, I would answer "No." Mere discussions in general terms are not worth much, but papers by competent technical men which contain original data or contain compilations and rearrangements of data resulting from research and experience, generally find their mark. Many men in related lines read, clip and carefully file such articles when these papers are published. Technical papers are specialized and cannot be expected to have, in fact are not intended for, general reading and digestion.

H. M. HOUSTON,

Superior Gas Engine Co.

Springfield, Ohio, Nov. 29.

NOVEMBER STEEL OUTPUT

Increase Over October About 7.75 Per Cent in Daily Rate—Yearly Rate About 38,775,000 Tons

Despite a total steel ingot output in November less than in October, due to two less operating days, a substantial gain was registered last month in daily output. The increase in November over October was 9050 tons per day, or about 7.75 per cent as against 6970 tons per day, or about 6.5 per cent for October over September.

The statistics of the American Iron and Steel Institute show that the November output of the companies which made 94.84 per cent of the country's total in 1923 was 2,946,893 gross tons. Assuming that the 5.16 per cent not reporting produced at the same rate, a total November output is indicated of 3,107,226 tons. The corresponding annual rate is about 38,775,000 tons or 71.6 per cent of capacity, against 66 per cent in October.

The table gives the production by months of the different kinds of steel, together with the estimated daily rate for all companies.

Monthly Production of Steel Ingots, Reported by Companies Which Made 94.84 Per Cent of the Steel Ingots in 1923 (Gross Tons)

Months, 1924	Open-hearth	Bessemer	All Other	Calculated Monthly Production All Companies	Approximate Daily Production All Companies
Jan.	2,766,534	667,032	12,577	2,633,639	124,579
Feb.	2,902,641	695,906	14,085	2,809,185	152,367
March	3,249,783	706,801	15,260	4,187,942	161,075
April	2,575,788	573,381	12,356	3,323,535	128,213
May	2,060,896	425,099	6,648	2,628,261	97,343
June	1,637,660	310,070	2,622	2,056,466	82,259
July	1,525,913	241,880	5,162	1,869,416	71,901
Aug.	2,042,820	361,781	5,759	2,541,501	97,750
Sept.	2,252,976	409,922	6,844	2,814,996	108,269
Oct.	2,505,403	438,468	7,030	3,111,462	115,239
Nov.	2,479,147	459,349	8,397	3,107,226	124,289
11 mos. . .	35,999,560	5,289,688	96,740	33,093,619	115,712
1923					
Jan.	2,906,892	728,270	9,467	3,841,095	142,263
Feb.	2,613,564	669,903	10,797	3,471,843	144,660
March	3,046,309	799,525	12,841	4,066,680	150,618
April	2,974,579	772,485	13,933	3,963,736	158,549
May	3,136,558	847,418	16,719	4,216,355	156,161
June	2,821,239	737,845	15,483	3,767,256	144,894
July	2,658,449	680,884	11,496	3,521,458	141,258
Aug.	2,796,370	701,059	9,326	3,695,783	136,881
Sept.	2,562,771	613,709	8,602	3,254,776	134,271
Oct.	2,735,513	649,452	9,163	3,577,091	132,485
Nov.	2,348,261	616,335	9,309	3,134,321	120,551
11 mos. . .	30,600,605	7,816,885	127,136	46,622,399	142,036
Dec.	2,135,898	570,004	10,912	2,863,266	114,531
Total . . .	32,736,503	8,386,889	138,048	43,485,665	139,825

Seneca Iron & Steel Co. Addition

BUFFALO, Dec. 9.—The Seneca Iron & Steel Co. will erect six new mills at its Blaisdell plant for the manufacture of full-finished sheets. The contract for the mills has not yet been let, but the contract for the steel for the three new buildings which will house the mills has been let to the Lackawanna Steel Construction Co. The tonnage required is 900.

No departure is contemplated in manufacturing policy. The new mills will merely augment the capacity of the Seneca company for the manufacture of black sheets, principally for automobiles. Construction on the buildings will be started immediately. The buildings will cover 125,000 to 130,000 sq. ft., and 10 new mills will be in operation by the middle of the summer.

The machinery, equipment and buildings of the rolling mill of Brown & Co., Inc., Pittsburgh, was offered at auction Dec. 9 by Samuel T. Freeman & Co. This plant was bought some time ago by Briggs & Turivas, Inc., Chicago dealer in old material and salvaged equipment.

Iron and Steel Markets

FURTHER IMPROVEMENT

Specifications in Larger Volume and Operations Increasing

Bolts and Nuts on a Delivered Price Basis—Advances in Pig Iron

The position of steel has improved in the week, both in volume of business and production, with further indications that the stronger price situation of the past few weeks will be maintained.

Specifications are coming in at a rate that has brought more mill capacity into action, notably in the Pittsburgh and Youngstown districts, where operations of the larger plants are getting close to 80 per cent, a scale unlooked for a fortnight ago. Two Carnegie blast furnaces have gone in and two more are scheduled. A National Tube Co. furnace has just started and two Jones & Laughlin furnaces will be going in ten days.

For November, ingot production averaged 71.6 per cent of capacity. This week it is between 75 and 80 per cent.

While the desire of buyers to keep down their supplies over the year-end is still a factor, there is evidence also that a restocking movement is under way that will call for heavier mill deliveries early in January. This insures a good rate of operation throughout December, and in some lines, particularly bars, consumers are making sure of deliveries rather than of small inventories.

Secondary lines have not increased their business in proportion to the recent expansion in the call for steel; some of them for seasonal or other reasons have had no increase, but the expectation of larger operations in 1925 is general.

Automobile companies are quite conservative in contracting for the new year, but one large maker placed 8000 tons last week, chiefly steel bars.

Railroad buying persists as a leading factor, and rail and car orders of large volume are pending. These include 40,000 tons of rails each for the Chicago & North Western and the Rock Island, 25,000 tons for the Soo Line, 20,000 tons for the Nickel Plate and 10,000 tons for the Pere Marquette.

The St. Louis Southwestern bought 1000 and the Rock Island 750 cars. Locomotive purchases totaled 49. The Louisville & Nashville and the Missouri Pacific each entered the market for 1000 cars.

Railroad bridge and shop construction was one-sixth of the 30,000 tons of fabricated steel bookings. Public work accounted for one-fourth and industrial buildings for over one-fifth. Fresh inquiries amount to nearly 45,000 tons, including

17,000 tons for the Carquinez Straits bridge in California.

Wire mill operations are improving and a Western independent is running at 80 per cent of capacity. Buyers have not taken seriously reports of a further early advance in wire products.

There is greater activity in merchant pipe, but oil country trade lags and no important line pipe projects are in sight.

Bolt and nut makers have adopted a new schedule under which all consumers pay like delivered prices in the large territory east of the Mississippi, which takes the bulk of the product. The new prices are roughly 10 per cent above the former Pittsburgh, Cleveland and Chicago basis, but as each producer makes freight allowance the actual advance to consumer averages 7 to 8 per cent. The new move shows how abolition of Pittsburgh basing is localizing business and reducing rail hauls.

Chicago and Cleveland again report sales of about 40,000 tons of pig iron and there has been moderate activity in the East. Prices of steel making grades have been advanced 50c. per ton at Pittsburgh, another general advance of 50c. has been recorded at Chicago, and Alabama iron has again been marked up \$1, making the new price \$20, or \$2.50 more than a month ago.

The German raw steel syndicate has ordered a continuance, through January, of the 20 per cent curtailment in output.

Two British railroads are allocating orders totaling 5000 freight cars. One of them plans to spend £6,000,000 next year on locomotives and rolling stock.

Reaching the highest point in seven months, THE IRON AGE pig iron composite price is \$21.34, compared with \$20.71 last week. The increase in five weeks has been \$2.13.

The finished steel composite remains at 2.531c. per lb., the highest level since July. The advance in five weeks (from the year's "low") has been less than 3 per cent, compared with 11 per cent in pig iron.

Pittsburgh

Trend Still Upward in Steel Market—Production Steadily Increasing

PITTSBURGH, Dec. 9.—The steel market still is headed upward, whether viewed from the angle of business, prices or production. While here and there some hesitancy is noted in specifications against tonnages for delivery over the remainder of the year, this is chiefly among the lighter lines in which jobbers are an important factor in distribution and these interests do not want to show large merchandise holdings in their year-end statements. But so far as shipments for after Jan. 1 are concerned, there is no abatement in the demand and with a fair sprinkling of orders at the advanced prices lately established it is becoming apparent that some buyers are either afraid of not being

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 9, 1924	Dec. 2, 1924	Nov. 11, 1924	Dec. 11, 1923
No. 2X, Philadelphia...	\$24.51	\$23.76	\$21.76	\$24.26
No. 2, Valley Furnace...	20.50	20.50	19.00	22.00
No. 2, Southern, Cin'ti...	24.05	23.05	21.55	25.05
No. 2, Birmingham, Ala...	20.00	19.00	17.50	21.00
No. 2 foundry, Chicago...	22.00	21.50	21.00	23.00
Basic, del'd, eastern Pa...	23.00	22.50	20.00	23.25
Basic, Valley furnace...	20.50	20.00	19.00	21.00
Valley Bessemer del. P'gh.	23.20	22.76	22.26	24.76
Malleable, Chicago*	22.00	21.50	21.00	23.00
Malleable, Valley	20.50	20.50	19.50	20.00
Gray forge, Pittsburgh...	21.76	21.76	20.26	23.26
L. S. charcoal, Chicago...	29.04	29.04	29.04	29.15
Ferromanganese, furnace...	105.00	105.00	100.00	107.50

Rails, Billets, Etc., Per Gross Ton:

O.-h. rails, heavy, at mill...	\$43.00	\$43.00	\$43.00	\$43.00
Bess. billets, Pittsburgh...	35.50	35.50	35.50	40.00
O.-h. billets, Pittsburgh...	35.50	35.50	35.50	40.00
O.-h. sheet bars, P'gh...	37.00	37.00	37.00	42.50
Forging billets, base, P'gh.	42.50	40.50	40.50	45.00
O.-h. billets, Phila...	41.67	41.67	41.17	45.17
Wire rods, Pittsburgh...	48.00	48.00	45.00	51.00
Skelp, gr. steel, P'gh, lb...	2.00	1.90	1.90	2.35
Light rails at mill...	1.80	1.80	1.80	2.25

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.32	2.32	2.32	2.67
Iron bars, Chicago...	2.00	2.05	2.10	2.40
Steel bars, Pittsburgh...	2.10	2.10	2.00	2.40
Steel bars, Chicago...	2.10	2.10	2.00	2.50
Steel bars, New York...	2.44	2.44	2.34	2.74
Tank plates, Pittsburgh...	1.90	1.90	1.80	2.50
Tank plates, Chicago...	2.20	2.20	2.10	2.60
Tank plates, New York...	2.24	2.14	1.94	2.74
Beams, Pittsburgh...	2.10	2.10	2.00	2.50
Beams, Chicago...	2.20	2.20	2.10	2.60
Beams, New York...	2.34	2.34	2.14	2.74
Steel hoops, Pittsburgh...	2.50	2.50	2.50	3.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market report on other pages.

Sheets, Nails and Wire,	Dec. 9, 1924	Dec. 2, 1924	Nov. 11, 1924	Dec. 11, 1923
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.50	3.50	3.50	3.75
Sheets, black, No. 28, Chi-				
cago dist. mill...	3.70	3.70	3.60	...
Sheets, galv., No. 28, P'gh.	4.75	4.60	4.60	4.90
Sheets galv., No. 28, Chi-				
cago dist. mill...	4.85	4.85	4.70	...
Sheets, blue, 9 & 10, P'gh.	2.70	2.70	2.70	3.00
Sheets blue, 9 & 10, Chi-				
cago dist. mill...	2.80	2.80	2.80	...
Wire nails, Pittsburgh...	2.85	2.85	2.75	3.00
Wire nails, Chicago dist.				
mill...	2.95	2.95	2.85	...
Plain wire, Pittsburgh...	2.60	2.60	2.50	2.75
Plain wire, Chicago dist.				
mill...	2.70	2.70	2.60	...
Barbed wire, galv., P'gh...	3.65	3.65	3.45	3.80
Barbed wire, galv., Chi-				
cago dist. mill...	3.65	3.65	3.55	...
Tin plate, 100 lb. box, P'gh.	\$5.50	\$5.50	\$5.50	\$5.50

Old Material, Per Gross Ton:

Carwheels, Chicago	\$19.50	\$19.50	\$18.50	\$19.50
Carwheels, Philadelphia...	19.00	19.00	17.50	19.50
Heavy steel scrap, P'gh...	21.50	20.00	19.50	18.50
Heavy steel scrap, Phila...	19.50	19.00	17.00	16.50
Heavy steel scrap, Ch'go...	18.25	17.75	17.25	16.00
No. 1 cast, Pittsburgh...	19.00	18.50	18.00	19.50
No. 1 cast, Philadelphia...	19.00	18.50	17.50	20.00
No. 1 cast, Ch'go (net ton)	18.50	18.00	18.00	19.50
No. 1 RR. wrot. Phila...	20.00	19.00	18.00	18.50
No. 1 RR. wrot. Ch'go (net)	19.50	18.00	15.50	15.00

Coke, Connellsville,

Per Net Ton at Oven:				
Furnace coke, prompt...	\$3.50	\$3.25	\$3.00	\$4.00
Foundry coke, prompt...	4.50	4.25	4.00	4.75

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	14.25	14.25	13.87 1/2	13.25
Electrolytic copper, refinery	13.87 1/2	13.87 1/2	13.62 1/2	13.87 1/2
Zinc, St. Louis...	7.07 1/2	7.10	6.72 1/2	6.25
Zinc, New York...	7.48 1/2	7.45	7.07 1/2	6.60
Lead, St. Louis...	8.70	8.60	8.87 1/2	7.37 1/2
Lead, New York...	9.00	9.00	8.90	7.82 1/2
Tin (Strait), New York...	55.12 1/2	55.12 1/2	54.37 1/2	46.50
Antimony (Asiatic), N. Y.	14.40	14.25	14.00	8.65

THE IRON AGE Composite Prices

Dec. 9, 1924, Finished Steel, 2.531c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 88 per cent of the United States output of finished steel.	{	Dec. 2, 1924, 2.531c.
		Nov. 11, 1924, 2.474c.
		Dec. 11, 1923, 2.772c.
		10-year pre-war average, 1.689c.

Dec. 9, 1924, Pig Iron, \$21.34 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham.	{	Dec. 2, 1924, \$20.71
		Nov. 11, 1924, 19.54
		Dec. 11, 1923, 21.89
		10-year pre-war average, 15.72

1924 to Date	Low	High	1923	Low	High
2.789c., Jan. 15.....	2.460c., Oct. 14.....	Finished Steel.....	2.824c., April 24.....	3.446c., Jan. 2	
\$22.88, Feb. 26.....	\$19.21, Nov. 3.....	Pig Iron.....	\$30.86, March 20.....	\$20.77, Nov. 20	

fully protected against their first quarter requirements or figure that higher prices are ahead.

The rush of specifications has found quick and very full reflection in plant operation, which for the fourth consecutive week shows further substantial increase, and with the starting of several more steel works blast furnaces authorized, it is evident that a still higher rate is immediately ahead. We now estimate the active ingot capacity in this and nearby districts at 80 per cent engaged, as compared with only slightly in excess of 60 per cent just prior to election day. The Carnegie Steel Co. is producing ingots at the rate of about 76 per cent of capacity, while the leading local independent is at least 10 per cent higher. Other local independents are running about 70 per cent, while

Wheeling and Youngstown districts are producing at about 80 per cent of physical capacity. The Carnegie Steel Co. has put on two furnaces in this district and ordered on two others. These additions will give that company 38 active stacks out of a total of 59. The National Tube Co. has lighted its rebuilt No. 1 stack at McKeesport, Pa., and now has nine of 11 furnaces in production. The Jones & Laughlin Steel Corporation has ordered one of its Aliquippa furnaces in on Dec. 12, and will start its remaining idle Eliza stack on Dec. 20. This will mean 11 out of 12 furnaces of that company in production.

Bolts and nuts are the latest lines to move upward in price. A new list of discounts reflects an increase of about 10 per cent over old prices, but in view of the

fact that a new method of selling is adopted with the change, whereby producers allow freight to destinations over much of the Eastern half of the country, the cost to consumers is probably little different than it has been in the present quarter. There is a stronger tendency in plate prices, with some of the independent producers now quoting 2c. base, Pittsburgh, as minimum. The former price of 1.90c. base, however, has not disappeared, although available only on the large tonnages. Boiler tubes are the one line in which there was a decline in the past year that has not yet definitely moved to higher levels.

Pig iron producers have pretty firm price ideas, especially in view of the increased strength of the coke market. Bessemer iron is up 50c. a ton on fair-sized sales, and a similar advance is noted on basic grades.

Marked strength still rules in the scrap market, with sales of heavy melting steel noted as high as \$22 at Vandergrift.

The question that now is most freely discussed is whether the present market is not a repetition of those of a year ago and two years ago at this time, when there was a rapid mounting of demand and production and then an equally rapid decline.

Pig Iron.—This market is firm but rather inactive. The largest single sale noted in the past week was 1000 tons of Bessemer iron at \$21.50, Valley furnace. This sale, with two or three others of small proportions, establishes the market on this grade at that figure and \$22 now is mentioned as the basis of the next sale. No sales of basic iron of importance are reported, but a test of the market provided by an inquiry by one producer for 5000 tons and another for 10,000 tons failed to bring out a quotation of less than \$20.50, Valley furnace, and \$21 was named by some producers. But, while the steel-making grades are definitely higher, this is not the case with foundry grade, which still is available at \$20.50, despite a more general asking price of \$21 and the fact that there was one sale last week for shipment over the first half of next year at \$22, Valley furnace. Malleable grade holds at former prices, although a test of the market now is being provided in an inquiry from a local user of from 1000 to 2000 tons for first quarter shipment. It is now established that total sales of iron on the November wave of buying ran well over 100,000 tons, much of the business having been done quietly. First quarter requirements of Pittsburgh district foundries are probably fully covered unless consumption exceeds expectations.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.76 per gross ton:

Basic	\$20.50
Bessemer	21.50
Gray forge	20.00 to 20.50
No. 2 foundry	20.50 to 21.00
No. 3 foundry	20.00 to 20.50
Malleable	20.50 to 21.00
Low phosphorus, copper free....	28.00 to 29.00

Ferroalloys.—Business still reflects the increasing rate of steel works operations and the good prospects for the early part of 1925. There is a really active market for spiegeleisen, with a number of good sized first quarter and first half contracts being entered at quotations. Sales of ferromanganese at \$105, Atlantic seaboard, do not require the sales effort they did recently; consumers have larger requirements and there is the additional factor of a possible advance in British material, due to the high rate of exchange. German ferromanganese still is available at \$102.50, c.i.f. Atlantic seaboard, duty paid, for 80 per cent, but does not appear to be hampering sales of other kinds at the full price. The 1925 price of \$82.50, delivered, on 50 per cent ferrosilicon, is reported to be finding little or no resistance from buyers; several good-sized contracts are reported closed at the full price. On 75 per cent ferrosilicon, the 1925 price is \$145, as compared with \$140 on current shipments. New price schedules have been announced on electric ferrosilicon of the lowest silicon contents, effective Dec. 4. Material running 10 to 11 per cent now is priced at \$38 per gross ton, f.o.b. Niagara Falls, with \$1 per-unit advance on material above 10 per cent. Prices are given on page 1581.

Semi-Finished Steel.—Prices show a firmer tendency and several makers actually have advanced forging quality billets by \$2.50 a ton, while some makers now are unwilling to consider less than \$38 for open-hearth sheet bars. Producers having finishing capacity of their own generally are so well provided with finished steel business that they see little surplus for the next few months over their own requirement and those of regular customers. Only a few makers now care to go to the trouble of producing forging quality billets and the number of sellers has been reduced. Bessemer steel capacity being less fully engaged than open-hearth capacity, some producers will take Bessemer sheet bars at less than open-hearth bars. Skelp no longer is offered at less than 2c., but sales are light. Rods now are quoted by all makers at \$48, Pittsburgh or Cleveland, and \$50, Chicago district mills. Prices are given on page 1581.

Wire Products.—Mills in this and nearby districts are heavily committed for the first three months of next year and part of an increase in mill operations, this branch of the industry now being 75 to 80 per cent engaged, against about 60 per cent just prior to the election, is explained by the production against shipments to be made after Jan. 1. Most mills would like a little business for shipment over the next two or three weeks, but on account of the inventory, such orders and specifications are rather light. The advanced prices now are generally quoted and closely observed.

Rails and Track Supplies.—Advanced prices recently named on track supplies are holding well and a very fair amount of 1925 business is coming to makers here. The range on small spikes is revised to take in the price of the American Steel & Wire Co., which is quoting \$3, base, f.o.b. Cleveland, as against \$3.10, Pittsburgh, the price of local makers. An order for light rails of sufficient size would probably bring out a price of 1.80c., base, mill for billet rails, but most makers in this area are not now going under 1.85c. on the ordinary inquiry. Prices are given on page 1580.

Sheets.—The market in the past week has become fairly established at the prices recently announced by the American Sheet & Tin Plate Co., as these prices now are the basis of all except possibly 5 per cent of the country's capacity. Black sheets still can be bought from a few mills at 3.50c., base, but on the other common finishes, the advanced prices now are the ruling ones. The mills have been filling up on first quarter business pretty rapidly in the past week and production schedules have risen sharply. The American Sheet & Tin Plate Co. is scheduled for 82 per cent operations this week, while 85 per cent of the independent mills are in operation, giving this branch of the industry an operating rate of about 83 per cent, against about 75 per cent last week. The automotive industry is scheduling production in keeping with orders and not producing, as it did a year ago, against expected spring business. Prices are given on page 1580.

Tin Plate.—Specifications against January and February shipments are coming to makers fairly freely, now that the matter of price is definitely out of the way for the first half of next year. Mill operations are not increasing perceptibly, because at their best, tin plate requirements of the first quarter of each year are moderate and there is not the tendency there was a year ago to produce and stock tin plate against future requirements.

Cold-Finished Steel Bars and Shafting.—Recent advance by makers in this territory to 2.80c., base, Pittsburgh, has further stimulated specifications and orders which had previously begun to expand in keeping with larger consumption. Most of the business on makers' books is at the former price, but there is already a sprinkling of orders carrying the new price. There is some hesitancy on the part of buyers to order out shipments over the remainder of this year, but that is because of the close proximity of inventory taking. Ground shafting has not yet been moved up from \$3.10c., base, f.o.b. mills for carload lots.

Hot-Rolled Flats.—Makers who continued to take business at the old prices appear to have become pretty heavily obligated and mills which advanced about two weeks ago find sales at the higher prices a little easier to make than they did recently. Price concessions have not entirely disappeared, but they are much less frequent than they have been. Most mills still could take some business for delivery between Dec. 15 and Jan. 15, as orders for delivery in that period are not as large as they are beyond the latter date. Prices are given on page 1580.

Cold-Rolled Strips.—The new base of 4.15c. is becoming more solid, as sellers willing to take less become filled up. But 4c. has not yet disappeared and in some cases, mills naming the higher prices have been obliged to meet that figure to hold old customers.

Iron and Steel Bars.—Mills in this and nearby districts are too well committed on steel bars to be much interested in additional business at less than the quoted price. No class of mills is better engaged at present than are the bar mills and the firmness of the market is not surprising. Iron bars also are doing well and on refined bars 2.90c., base, no longer is hard to obtain. Prices are given on page 1580.

Structural Material.—Mills in this area are at 2.10c. base on large structural beams and are sufficiently obligated to be pretty independent at that level. Some of the structural steel interests have noted "freezing" up of pending projects and some also have noted a falling off in new inquiry, while several need considerable business to insure steady operation of the shops throughout the winter. Local lettings are very light, being estimated at about 500 tons for the week. Plain material prices are given on page 1580.

Bolts, Nuts and Rivets.—New prices for bolts and nuts have been announced by makers in this district, for first quarter of 1925 business, which show an increase of about 10 per cent. New prices are f.o.b. factory, with freight allowed on shipments of carloads or less carloads of 1000 lb. or more into the following territory: A line drawn from Milwaukee to Dubuque, Iowa; all cities on or east of the Mississippi River to Cairo, Ill.; all cities on or east of the Ohio River to Ironton, Ohio; all cities on or north of the main line of the Norfolk & Western Railway from Ironton, Ohio, to Norfolk, Va., the upper peninsula of Michigan being excepted from the freight allowance territory. On Pacific, Atlantic and Gulf port shipments by water, the new prices are f.a.s. Atlantic ports of New York, Philadelphia and Baltimore. During the season of Lake navigation, freight will be allowed to Duluth, St. Paul and Minneapolis. On all shipments beyond the zone outlined, freight will be allowed to the natural gateways where shipments cross the zone line. There has been no announcement as to rivet prices. Prices are given on page 1581.

Plates.—With specifications against railroad car steel now coming to local mills, they no longer are very badly in need of plate business and the movement of prices toward more profitable levels continues. The leading local independent has gone to 2c., base Pittsburgh, as a minimum, and on small lots is asking 2.10c. We note small sales of sheared plates at 2c., but on the larger tonnages 1.90c. still can be done and much more business has been done lately at that figure than at a higher one. Prices are given on page 1580.

Tubular Goods.—Demand for merchant pipe, especially in the butt weld sizes, still is on a rising scale and this branch of the business is practically all that could be desired. There is some improvement in oil country goods, but much room for improvement remains. The industry just now is being carried along by merchant pipe business, since there are no important line pipe projects in sight. Stocks of oil above ground represent about five months' consumption and this, the ruling influence on oil prices, is keeping them too low to encourage fresh development work. Efforts to bolster boiler tubes prices are not overly successful because there is too much capacity for the demand. Discounts are given on page 1580.

Coke and Coal.—Coke prices still are rising. As a result of an active demand from a steel company in this district ordinarily self contained on coke supplies, spot supplies have melted away rapidly and producers lately have had no trouble in obtaining \$3.50 per net ton at oven, while a quotation of \$3.75 has appeared, although no sales of consequence have been made at that price. Having taken contracts for first quarter of next year amounting to in excess of 200,000 tons a month, producers now regard themselves as being in an independent position, and a sale of 10,000 tons a month to a northern New York producer of low phosphorus pig iron at \$4 has prompted most oven operators to regard that as the market for first quarter. The real top on regular coke has been \$3.50, higher prices being for coke running low in phosphorus, only a moderate amount of which is available. There is no promise that many furnaces now idle, which run on beehive oven coke, will resume in the next few months. Spot foundry coke has stiffened to a minimum of \$4.50 per net ton at ovens. Tonnages for shipment over the first quarter and half of next year are quoted from \$5 to \$5.50. Fair demand is noted from the steel companies for coking coal, but that market otherwise is dull. Prices show no material change, except on slack, which is firmer because of small supplies.

Old Material.—This market is gaining in strength, with sales of heavy melting steel noted as high as \$22 for delivery at Vandergrift, Pa. Specification for this delivery is a little exacting and a higher price is usually obtained there than elsewhere, but it is doubtful whether material of this grade or slightly less desirable quality can now be bought at less than \$21.50, and we regard the market as quotable at those extremes. Warren, Ohio, has paid up to \$21 for heavy melting steel and a Youngstown steel company has paid \$20.50. With the price in the Philadelphia district as high as \$20, the position of dealers here is very strong and they are taking full advantage of it. Steel foundries are evincing more interest in the market. This month's Pennsylvania Railroad scrap sold at \$21.75 to \$21.85, the specialties \$22.50 and yard material \$19 per gross ton, delivered this district. The Norfolk & Western Railway will take bids until noon Dec. 17 on 6482 gross tons of scrap.

We quote for delivery to consumer's mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel.....	\$21.50 to \$22.00
No. 1 cast, cupola size	19.00 to 19.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	20.50 to 21.00
Compressed sheet steel	19.50 to 20.00
Bundled sheets, sides and ends ..	18.50 to 19.00
Railroad knuckles and couplers ..	22.50 to 23.00
Railroad coil and leaf springs ..	22.50 to 23.00
Low phosphorus blooms and billet ends	24.50 to 25.00
Low phosphorus plate and other material	23.50 to 24.00
Railroad malleable	19.00 to 20.00
Steel car axles	22.50 to 23.00
Cast iron wheels	19.50 to 20.00
Rolled steel wheels	22.50 to 23.00
Machine shop turnings	17.00
Sheet bar crops	22.50 to 23.50
Heavy steel axle turnings	17.50 to 18.00
Short mixed borings and turnings ..	14.50 to 15.00
Heavy breakable cast	13.00 to 13.50
Stove plate	16.00 to 16.50
Cast iron borings	16.50 to 17.00
No. 1 railroad wrought	18.00 to 18.50
No. 2 railroad wrought	21.00 to 21.50

Power Company Purchased

BUFFALO, Dec. 9.—The Niagara, Lockport & Ontario Power Co. has purchased the Hydraulic Race Co., of Lockport, a power company which drew its power from the barge canal water. William L. Collins, secretary to Frederick D. Corey, president of the N. L. & O. Company, succeeds Charles E. Dickinson of Lockport, as president of the company. Collins, Corey and Warren Tubbs of Buffalo have become members of the board of directors. Paul F. Davis, Lockport, who has been secretary and treasurer of the company, will continue as such.

Chicago

Pig Iron Prices Advanced—Favorable Developments in Steel Market

CHICAGO, Dec. 9.—Market developments in both pig iron and steel have been of a favorable character. Continued buying has resulted in another 50c. advance in pig iron; specifications received by a leading mill rolling heavier products have been the largest in over a year and meanwhile new business is equal to the October average. In the lighter finished steel products also, better business has been booked; in fact a Western wire plant is now operating at 80 per cent of capacity.

Prices appear to be well established at the new levels and there is already some talk of another advance in wire and nails, as well as in some of the other finished steel lines. An encouraging feature of the market situation is the propensity of buyers to place repeat orders for both pig iron and finished steel. The prolongation of the buying movement is regarded as a good augury and yet the question is raised whether speculation has entered into recent purchases to any appreciable extent. Of course, practically all business is speculative in the sense that purchases of raw material must be made before orders for finished commodities are completely in hand, but so far as can be ascertained, recent buying has been actuated by more than a reasonable expectation of better demand from the ultimate consumer. In all secondary lines, a quickening of activity is to be observed and already there is commencing to be a shortage of certain classes of manufactured goods. On the whole, however operations of fabricators of secondary products are improving rather slowly, but with their business prospects materially better.

Buoyancy in building activity is a feature of the current situation, fabricated steel awards for the week amounting to more than 16,000 tons. Railroad buying also remains a most important market factor. Rail orders likely to be placed soon include 40,000 tons for the Chicago & North Western, a similar tonnage for the Rock Island Lines, 25,000 tons for the Soo Line and 10,000 tons for the Pere Marquette. New car business includes 1000 box cars placed by the Cotton Belt, 1000 box cars bought by the Wabash, and 750 refrigerator cars ordered by the Rock Island.

Local mill operations are improving steadily. A leading interest has blown in one stack each at Gary and at South Chicago, increasing the number of active steel works furnaces to 24 out of a total of 34 in Chicago territory. Its steel output has increased to 80 per cent of capacity, while a foremost independent is on a 90 per cent basis. After the first of the year, when these mills commence to fill their 1925 rail contracts, full operations are expected. Additional steel works blast furnaces are scheduled to go in very soon. The Youngstown Sheet & Tube Co. has completed a new furnace, which will probably be blown in early in January. The Inland stack which is being rebuilt will go in about Jan. 1. A Joliet furnace may be lighted within a week or ten days. At Duluth the two stacks of the Minnesota Steel Co. remain idle.

Pig Iron.—Local iron has advanced to \$22 base, Chicago furnace, and buying has continued at that figure. Sellers are no longer pressing for business, preferring to hold off until prices go still higher. Yet it is probably no exaggeration to say that 35,000 to 40,000 tons of iron was sold during the week. One local steel works furnace which has been a factor in merchant sales has withdrawn from the market. Another steel works interest which is at times a seller of iron has actually been forced to buy a considerable tonnage recently because one of its stacks is down for rebuilding. It is not only significant that repeat orders for iron are being placed but also that local furnaces are

being pressed for shipments against contracts. In fact, the situation has reached the point where producers are experiencing some difficulty in shipping as promptly as desired. The question has arisen whether any of the recent buying might be classed as speculative. The fact that there have been numerous repeat orders on each of the recent advances would seem to indicate that buyers see real business ahead and are taking no undue chances. A local melter who has recently placed considerable tonnage has put out a fresh inquiry for 1000 tons of malleable. Others have taken similar action, and yet there remain some buyers who have bought little or practically nothing either on account of the approach of inventory or because they prefer to wait until their own orders are actually in hand. It is likely that January will see buying by these laggards as well as considerable contracting for second quarter. Current inquiries call for 1000 tons and 500 tons of low phosphorus respectively. Producers of this grade are said to have advanced their prices. Liberal sales of silvery have tended to establish advanced quotations. Charcoal has been fairly active, but prices have not yet advanced. Several makers of 14 to 16 per cent ferrosilicon have advanced to \$42, Niagara Falls, or \$47.42, delivered, but a quotation of \$43.42, delivered, for prompt shipment, is still current. Southern foundry for all rail shipment has advanced to \$20 base, Birmingham, while barge and rail material has been raised to \$24.18, delivered.

Quotations on Northern foundry, high phosphorus, malleable and basic iron are f.o.b. local furnaces and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards.

Northern No. 2 foundry, sil. 1.75 to 2.25..	\$22.00
Northern No. 1 foundry, sil. 2.25 to 2.75..	23.00
Malleable, not over 2.25 sil.	22.00
Basic	22.00
High phosphorus	22.00
Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago.....	29.04
Southern No. 2 (barge and rail).....	24.18
Southern No. 2, sil. 1.75 to 2.25.....	26.01
Low phos., sil. 1 to 2 per cent, copper free.	32.00
Silvery, sil. 8 per cent.....	35.29
Electric ferrosilicon, 14 to 16 per cent....	43.42

Ferroalloys.—There have been numerous small sales of ferromanganese at \$105, seaboard, and another advance is expected before the close of the year. Most of the users of 50 per cent ferrosilicon have covered their 1925 requirements at \$82.50, delivered. Spiegeleisen is firm but quiet.

We quote 80 per cent ferromanganese, \$112.56, delivered; 50 per cent ferrosilicon, for 1925 delivery, \$82.50, delivered; spiegeleisen, 18 to 22 per cent, \$40.58, delivered.

Plates.—Specifications are very heavy and new business is up to the October average. Bookings from the carbuilders have been large and nearly 20,000 tons of plates have been placed with local mills by tank fabricators. A new oil field has come in near Wortham, Tex., and this has resulted in heavy placements of storage tanks. The Prairie Oil & Gas Co. has awarded 22 tanks, requiring 3500 tons, for that location, to the Chicago Bridge & Iron Works. At Denver a riveted pipe line calling for 2000 tons of plates has been placed, the steel going to a local mill.

The mill quotation is 2.20c., Chicago. Jobbers quote 3.10c. for plates out of stock.

Structural Material.—Counting 3500 tons of oil storage tankage and 2000 tons for a riveted pipe line, fabricating awards for the week aggregate more than 16,000 tons. A number of attractive new inquiries have appeared, foremost among them the Jackson Shore Hotel, Chicago, 3200 tons. Both specifications and orders for plain material are heavy, indicating that the market is well established at the new level.

The mill quotation on plain material is 2.20c., Chicago. Jobbers quote 3.10c. for plain material out of warehouse.

Sheets.—Specifications are in good volume and new business is steadily being booked at the new prices. While demand for sheets even yet lacks the impetus which has characterized buying of heavier forms of finished steel, it is felt that the time is not far distant when an advance in blue annealed will follow the recent ad-

vances in black and galvanized. A Western maker is now scheduled 60 days ahead on blue annealed.

Chicago delivered prices from mill are: 3.75c. for No. 28 black, 2.85c. for No. 10 blue annealed, 4.90c. for No. 28 galvanized. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Jobbers quote f.o.b. Chicago: 3.80c. base for blue annealed, 4.50c. base for black, and 5.50c. base for galvanized.

Bars.—Soft steel bar specifications are the heaviest in over a year and new business is in encouraging volume, indicating that the recent advance is holding. Tonnage is coming from practically all classes of customers, suggesting a widespread quickening of industrial activity. The policy of the automobile manufacturers still lacks uniformity, some buying sparingly while others are ordering more liberally. Yet the demands from that industry have increased sufficiently to stiffen alloy steel bar prices. Alloy steel has not advanced, however, and for Chicago delivery is quoted at \$2 above the prices at Pittsburgh, shown on page 1581. The situation in bar iron is very erratic with prices ranging from 2c. to 2.10c., Chicago. No definite Duluth base has been established on steel bars, as mills prefer to meet competition as it develops, competition being sharpest during the season of lake navigation. Recent sales of bars, however, have been made at 2.25c., Duluth, or \$3 a ton higher than the ruling price at Chicago. This compares with a price of 2.405c., Duluth, which would obtain if sales there were made on a Chicago base.

Mill prices are: Mild steel bars, 2.10c.; common bar iron, 2c. to 2.10c., Chicago; rail steel, 2c. to 2.10c., Chicago mill.

Jobbers quote 3c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting are 3.80c. for rounds and 4.30c. for flats, squares and hexagons; 4.15c. for hoops and 3.65c. for bands.

Jobbers quote hard and medium deformed steel bars at 2.60c.

Wire Products.—Specifications are heavy and some new business has been placed at the advanced prices. Mill operations are improving; in fact, a Western independent is running at 80 per cent of capacity. According to a persistent rumor, which as yet lacks verification, another advance in wire products will be announced shortly.

We quote warehouse prices f.o.b. Chicago: No. 8 black annealed, \$3.15 per 100 lb.; common wire nails, \$3.25 per 100 lb.; cement coated nails, \$2.55 per keg.

Rails and Track Supplies.—The Chicago & North Western is about to close for 40,000 tons of rails and close to 10,000 tons of angle bars, tie plates, spikes and bolts and the Rock Island is expected to follow shortly with an equal tonnage of rails and fastenings, although its budget has not yet been definitely approved. The Soo Line is inquiring for 25,000 tons of rails and the Pere Marquette is in the market for 10,000 tons. The Chesapeake & Ohio is about to place 25,000 kegs of spikes and bolts. Miscellaneous bookings of fastenings have been in good volume, one mill having taken an aggregate of 3500 tons of angle bars, 1700 tons of tie plates and 5000 kegs of spikes.

Standard Bessemer and open-hearth rails, \$43; light rails, rolled from billets, 1.90c. to 2c., f.o.b. maker's mill.

Standard railroad spikes, 2.90c. mill; track bolts with square nuts, 3.90c. mill; steel tie plates, 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.45c. base, and track bolts, 4.45c. base.

Cast Iron Pipe.—The National Cast Iron Pipe Co. is low bidder on 2000 tons of 6- and 16-in. for Detroit with a tender figuring back to between \$38 and \$38.50, base Birmingham. No new prospective work has developed, but considerable tonnage is expected to come up for bids in January in anticipation of spring laying work. Seven cities in this district are known to have drawn up definite programs calling for an aggregate of 16,000 tons.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$50.70 to \$51.20; 6-in. and over, \$46.70 to \$47.20; Class A and gas pipe, \$5 extra.

Bolts and Nuts.—Prices were advanced 10 per cent, effective Dec. 4, but it is doubtful whether the new discounts will net bolt and nut makers much more than the old quotations, inasmuch as the new figures are on the basis of delivery at consumers' plants throughout

the territory north of the Ohio River, east of the Mississippi River and as far north as a line drawn from Dubuque to Milwaukee. Buyers outside of this territory will pay the market prices plus the freight to the nearest gateway. In quoting uniform delivered prices, the bolt and nut trade is reverting to a practice in vogue years ago. A similar method of quoting prevails among steel castings manufacturers. For delivered prices in the territory specified see page 1581.

Jobbers quote structural rivets, 3.50c.; boiler rivets, 2.70c.; machine bolts up to $\frac{3}{4}$ x 4 in., 55 per cent off; larger sizes, 55 off; carriage bolts up to $\frac{3}{4}$ x 4 in., 50 off; larger sizes, 50 off; hot pressed nuts, squared, tapped or blank, \$2.50 off; hot pressed nuts, hexagon, tapped or blank, \$4 off; coach or lag screws, 60 per cent off.

Cold Finished Steel Bars and Shafting.—Prices have been advanced \$2 a ton to 2.80c. per lb. base, f.o.b. Chicago. Specifications are plentiful and there is little doubt that the advance will hold.

Reinforcing Bars.—The market is quiet with lettings few and relatively little new tonnage in immediate prospect.

Lettings include:

Southern Doctors' Hospital, New Orleans, 200 tons to Concrete Engineering Co.

Anderson Public School, Chicago, 140 tons to Olney J. Dean & Co.

Illinois State highway work, 215 tons to Concrete Steel Co. Municipal bridge, Milwaukee, 110 tons to Olney J. Dean & Co.

Pending work includes:

High school building, Muskegon, Mich., 200 tons.

Reservoir, Oak Park, Ill., 150 tons.

Rivets.—Small rivets have been advanced to 70 off, Chicago, while large rivets remain unchanged at 2.75c. per 100 lb., Chicago. Specifications are increasingly heavy.

Fluorspar.—Several contracts for gravel fluorspar for both first half and full 1925 delivery have been closed on the basis of \$17.50, mines, for 80 per cent and \$18, mines, for 85 per cent.

Old Material.—Purchases of 30,000 tons of heavy melting by a leading mill at \$18.50 delivered have again stimulated activity in the trade. In fact, brokers are already paying \$18.75 to \$19 for the same material. Liberal consumer orders for wrought and busheling have resulted in advances in those grades and low phosphorus steel has also stiffened on better buying. Users of malleable are still holding back, and cast grades are rather quiet. Among the railroads, the Santa Fe has advertised 4000 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton
Iron rails	\$19.00 to \$19.50
Cast iron car wheels	19.50 to 20.00
Relaying rails, 56 and 60 lb.	30.00 to 37.00
Relaying rails, 65 lb. and heavier ..	27.00 to 32.00
Forged steel car wheels	22.00 to 22.50
Railroad tires, charging box size ..	22.00 to 22.50
Railroad leaf springs, cut apart ..	19.50 to 20.00
Rails for rolling	20.50 to 21.00
Steel rails, less than 3 ft.	18.25 to 18.75
Heavy melting steel	18.25 to 18.75
Frogs, switches and guards cut apart	15.50 to 19.00
Shoveling steel	18.00 to 18.50
Drop forge flashings	14.00 to 14.50
Hydraulic compressed sheets	15.50 to 16.00
Axle turnings	16.00 to 16.50
Steel angle bars	19.00 to 19.50
Steel knuckles and couplers	22.00 to 22.50
Steel springs	23.00 to 23.50
Low phos. punchings	19.50 to 20.00
Machine shop turnings	11.50 to 12.00
Cast borings	13.75 to 14.25
Short shoveling turnings	13.75 to 14.25
Railroad malleable	19.50 to 20.00
Agricultural malleable	19.00 to 19.50

	Per Net Ton
Iron angle and splice bars	19.00 to 19.50
Iron arch bars and transoms	21.50 to 22.00
Iron car axles	27.00 to 27.50
Steel car axles	30.50 to 31.00
No. 1 busheling	14.50 to 15.00
No. 2 busheling	10.50 to 11.00
Pipes and flues	13.00 to 13.50
No. 1 railroad wrought	16.50 to 17.00
No. 2 railroad wrought	16.25 to 16.75
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	17.00 to 17.50
No. 1 agricultural cast	17.00 to 17.50
Locomotive tires, smooth	18.25 to 18.75
Stove plate	16.00 to 16.50
Grate bars	15.50 to 16.00
Brake shoes	15.50 to 16.00

New York

Larger Steel Backlog at Mills Than in Ten Months

NEW YORK, Dec. 9.—Buying has been chiefly for first quarter, but specifications have been coming in at such a rate that mills are generally turning out all they possibly can with steps being taken further to expand. Business so far in December has been fully equal to plant capacity. By about Dec. 20 it is expected there will be a general releasing of orders against tonnages remaining on the present quarter protection, thus to secure deliveries without affecting inventories. Buying of sheets and pipe is described in some quarters as boiling; specifications are coming in regularly for tin plate, and the volume of bar business remains good, with a notable amount of bars for reinforced concrete construction. Wire nails and other wire products are relatively slow, and there is considerable mill space for structural shapes. Apparently these are still to be obtained at 12c. Pittsburgh basis. In the East good deliveries of plates may be made, but prices have been advanced \$2 and \$3 a ton, partly on the score that going business can be obtained as easily at the basis of 1.90c. to 1.95c., Pittsburgh, as at 1.80c. The quoting of bolts and nuts on a delivered basis is referred to in other market reports, the net result being that in the East, at least, the new discounts will mean an average of 5 per cent increase at the mills. Of course, with the same delivery price everywhere, the mill prices, after providing for the freight allowances, will mean highly variable mill prices. There is a lull in new buying of cold finished steel, and the new prices are as yet untested. Not in ten months have the mills had the backlog of orders which now is the case.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.44c.; plates, 2.24c. to 2.29c.; structural shapes, 2.34c. to 2.44c.; bar iron, 2.34c.

Pig Iron.—Buying of pig iron has been light during the past week and probably has not amounted to over 10,000 tons in the metropolitan district, the largest tonnage being 5000 bought by the Thatcher Furnace Co. for first quarter delivery. Very little inquiry of an open character is pending, but it is understood that a fairly large tonnage is being quietly negotiated. Owing to this being inventory-taking season, the decrease in buying activity is to be expected. Prices are firm and unchanged.

We quote delivered in the New York district as follows having added to furnace price \$2.27 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.44 from Virginia:

East. Pa. No. 2, sil. 1.75 to 2.25..	\$24.77 to \$25.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	25.77 to 26.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	25.02 to 25.52
Buffalo, sil. 1.75 to 2.25.....	26.91
No. 3 Virginia, sil. 1.75 to 2.25..	30.44

Ferrolloys.—Consumers of ferromanganese are buying only for immediate needs and the market is not particularly active. Sales and inquiries in the past week have been confined to carload and small lots. All business has been done at the full price of \$105, seaboard basis. The spiegeleisen market has been quite active, the volume of sales running into 2000 to 3000 tons. One reason offered for the fairly heavy buying is that prices are regarded as low. It is predicted by some ferromanganese sellers that if sterling exchange continues to advance, or is likely to be considerably higher in the next month or two, an increase in the price would be both logical and necessary.

Warehouse Business.—Both orders and inquiries have fallen off and a spell of quiet prevails. On what business is done, however, prices appear to hold well, and in some cases to advance. It is thought that most warehouse stocks have been built up appreciably in recent weeks. There is marked improvement in demand for wrought iron pipe, orders and inquiries coming in for good tonnages; prices are much firmer and a readjustment is expected. Brass sheet, rod, tube and wire prices have advanced ¼c. per lb. In shafting and

screw stock quotations have been advanced 10c. to 4.15c. for rounds and 4.65c. for squares, flats and hexagons. Here again demand is quiet and little business has been done at the new prices. Quotations are given on page 1594.

Cast Iron Pipe.—With makers generally booked full until the end of January or into February, higher quotations for spring business are expected. A public utility company placed 3000 tons of pipe with one maker and 1000 tons with another last week. A Detroit light and power company has awarded 14,000 tons of pipe to one maker, bringing that producer's total bookings for the past few weeks to almost the total bookings of the previous 11 months. Several thousand tons of cast iron pipe have been placed for export, orders coming from Belgium and South American markets. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, \$55.60 to \$56.60; 4-in. and 5-in., \$60.60 to \$61.60; 3-in., \$70.60 to \$71.60, with \$5 additional for Class A and gas pipe. The soil pipe market is unchanged, but prices are firm and an early advance is expected. Discounts of both Northern and Southern makers of soil pipe, f.o.b. New York, are as follows: 6-in., 42½ to 43½ per cent off list; heavy, 52½ to 53½ per cent off list.

Old Material.—Greater stability is evident on all grades, but the market continues quiet. In some quarters it is reported that scrap is coming out more freely than in the previous two or three weeks. No. 1 heavy melting steel is firm at \$19 to \$20 per ton, delivered eastern Pennsylvania, with brokers offering \$19 to \$19.50 per ton, delivered. Prices on practically all grades continue unchanged, but with the undercurrent of sentiment toward higher rather than lower quotations. Stove plate is firm at \$15 per ton, delivered to a New Jersey consumer taking a \$2.02 freight rate. Specification pipe is quoted by brokers at \$17 to \$17.50 per ton, delivered eastern Pennsylvania. Chemical borings are going forward to Gibbstown, Bound Brook and Irvington, N. J., and the market is strong. Borings and turnings at \$13.50 to \$14 per ton, and in one instance \$15 per ton, delivered eastern Pennsylvania consumers are still the quietest grade in the market.

Buying prices per gross ton New York follow:

Heavy melting steel, yard.....	\$14.00 to \$14.50
Heavy melting steel, railroad or equivalent	15.25 to 15.75
Rails for rolling	15.50 to 16.00
Relaying rails, nominal	24.00 to 25.00
Steel car axles	19.50 to 20.00
Iron car axles	26.00 to 28.00
No. 1 railroad wrought	15.00 to 15.50
Forge fire	11.00 to 11.50
No. 1 yard wrought, long.....	14.00 to 14.50
Cast borings (steel mill).....	10.75 to 11.25
Cast borings (chemical).....	16.00 to 17.00
Machine shop turnings	11.50 to 12.50
Mixed borings and turnings.....	10.00 to 10.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	13.25 to 13.75
Stove plate	12.50 to 13.00
Locomotive grate bars	12.50 to 13.00
Malleable cast (railroad)	14.00 to 14.50
Cast iron car wheels	15.00 to 16.00
No. 1 heavy breakable cast.....	13.25 to 13.75

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	\$17.00 to \$17.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	14.00 to 14.50

Large Oil Refinery for Argentina

President Eugene G. Grace of the Bethlehem Steel Corporation states that a contract has been closed with the Argentine Government for the immediate erection of a complete oil refinery at La Plata. It is estimated that two years will be required to complete the project. The refinery will be capable of handling 14,000 bbl. of crude oil daily and the estimated cost of production is \$7,000,000. According to a statement by the Bethlehem corporation, further development of the Argentine oil fields is under way and it is expected that "home refining will encourage the use of motor vehicles and gasoline-driven farm implements throughout the republic."

Boston

Renewed Buying of Pig Iron Noted with Prices Holding Well

BOSTON, Dec. 9.—In contrast with general expectations, there was good buying of pig iron in this market the past week, with aggregate sales above 10,000 tons and including 2000 tons of basic for second quarter delivery; 1000 tons No. 2X and No. 1X, for December and January delivery; another 1000-ton lot, for first quarter delivery; and several round tonnages of charcoal as well as regular foundry iron, for first quarter delivery. Charcoal iron was largely purchased in anticipation of higher prices rather than for current needs. New York State iron figured prominently in transactions at prices slightly below those asked delivered for eastern Pennsylvania. Price details regarding the basic transaction are withheld. Purchases were made by a diversified list of industries, the largest lots going to Massachusetts and Rhode Island foundries. A western Pennsylvania furnace heretofore making No. 2X contracts at \$20.50, furnace base, and No. 1X at \$21, has advanced \$1 a ton. Other furnaces are holding prices firmly. A Connecticut foundry reports an increase of 50 per cent in its melt, but generally there is little improvement in the actual consumption of iron in that or other New England States.

We quote delivered prices on the basis of the latest reported sales as follows, having added \$3.65 freight from eastern Pennsylvania, \$4.91 to \$5.92 from western Pennsylvania; \$4.91 from Buffalo, \$5.92 from Virginia and \$9.60 from Alabama:

East. Penn., sil. 1.75 to 2.25	\$25.65 to \$26.65
East. Penn., sil. 2.25 to 2.75	26.15 to 27.15
West. Penn., sil. 1.75 to 2.25	26.91 to 27.91
West. Penn., sil. 2.25 to 2.75	26.91 to 28.41
Buffalo, sil. 1.75 to 2.25	26.91 to 27.91
Buffalo, sil. 2.25 to 2.75	27.91 to 28.91
Virginia, sil. 1.75 to 2.25	29.42 to 29.92
Virginia, sil. 2.25 to 2.75	29.92 to 30.42
Alabama, sil. 1.75 to 2.25	28.60 to 29.60
Alabama, sil. 2.25 to 2.75	29.10 to 30.10

Finished Material.—No important business has been booked recently by fabricators of steel. There is, however, several thousand tons pending, which gives promise of closing this month. The market for structural shapes generally is \$2.36½ to \$2.46½ per 100 lb. delivered Boston, freight allowed, or 2c. to 2.10c., Pittsburgh base, but there are instances where fabricators are protected for the rest of 1924 at less than 2c., Pittsburgh base. Plates are \$2.21½ per 100 lb. delivered, or 1.85c., Pittsburgh base, on new bookings, while 1924 protected specifications are being made at 1.75c., Pittsburgh base. Bars are \$2.46½ per 100 lb. delivered, or 2.10c., Pittsburgh base, and wire nails \$3.191 delivered Boston, or \$2.80 Pittsburgh base.

Coke.—The movement of by-product foundry coke from ovens to consumers continues to show a gain over the corresponding days last month, but the gain is small. Both the New England Coal & Coke Co. and the Providence Gas Co. quote such fuel at \$11.50 a ton delivered within New England.

Old Material.—The buoyancy of chemical boring prices is the outstanding feature of the old material market. On urgent buying, these borings have advanced another \$1 a ton, making a gain of \$2.25 within a fortnight. Machine shop turnings recently sold as high as \$12.50 a ton on cars, but average prices paid range from \$11.75 to \$12.25. For heavy melting steel, \$15.50 has been paid, while \$15 represents the average top price. Yard wrought, for New England consumption, is selling at \$15.50 to \$16 delivered. Railroad malleable has jumped up, but little material is actually moving out of New England. No. 1 machinery cast also is higher and inactive. No. 2 cast, on the other hand, is no higher, there being no market for it. A New England brake shoe manufacturer is reported as buying stove plate direct from yards, but the story is not substantiated. In general, the scrap market is strong and fairly active. The inclination to hold out for still higher prices is still checking actual sales,

however. The General Electric Co., West Lynn, Mass., averaged good prices for material sold the past week.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	\$20.00 to \$21.50
No. 2 machinery cast	17.00 to 18.00
Stove plates	15.00 to 15.50
Railroad malleable	19.00 to 19.50

The following prices are offered per gross ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$14.00 to \$15.00
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	12.50 to 13.00
Wrought pipe (1-in. in diam., over 2 ft. long)	12.00 to 12.50
Machine shop turnings	11.75 to 12.25
Cast iron borings, chemical	15.00 to 16.00
Cast iron borings, rolling mill	10.50 to 11.00
Blast furnace borings and turnings	9.50 to 10.25
Forged scrap	10.50 to 11.00
Bundled skeleton	10.50 to 12.00
Bundled cotton ties	9.00 to 11.00
Forged flashings	11.50 to 12.00
Shafting	18.50 to 30.00
Street car axles	18.50 to 19.00
Rails for rerolling	15.00 to 15.50
Scrap rails	14.00 to 14.50

St. Louis

Little Buying of Pig Iron or Finished Material in a Quiet Week

ST. LOUIS, Dec. 9.—Buying of pig iron during the last week was very light, as was to be expected following a heavy buying period which continued through November. Most melters are covered for the rest of 1924, but there is still much to be bought for the first quarter of 1925. However, it is not believed that there will be any considerable buying movement until after the holidays. Both melters and makers are content to wait. The market is strong, with Southern iron at \$19 to \$20, Birmingham; and Northern, \$21.50 to \$22, Chicago. The St. Louis Coke & Iron Co. sold 2300 tons of foundry iron, of which 600 tons went to a Belleville stone plant. There are no sizable inquiries pending.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.16 freight from Chicago, \$3.28 from Florence and Sheffield (rail and water), \$5.17 from Birmingham, all rail, and 81c. average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	\$23.66 to \$24.16
Northern malleable, sil. 1.75 to 2.25	23.66 to 24.16
Basic	23.66 to 24.16
Southern fdy., sil. 1.75 to 2.25 (rail)	24.17 to 25.17
Southern fdy., sil. 1.75 to 2.25 (rail and water)	23.28 to 23.28
Granite City iron, sil. 1.75 to 2.25	23.81 to 24.31

Finished Iron and Steel.—This has been a quiet week. No inquiries of moment have come from the railroads. Warehouses and manufacturers of metal products, who had been buying more heavily during the last few weeks, are interested only in odds and ends for immediate use. It is not expected that there will be any buying of consequence until after the holidays. It is understood that the Kansas City Southern Railroad will place orders for 6000 tons of rails as follows: 3000 to Bethlehem Steel Co., 2000 to Colorado Fuel & Iron Co., and 1000 to Inland Steel Co. The Missouri Highway Commission let contracts for 175 miles of concrete roads, although it is unlikely that the bars will be bought until next spring.

For stock out of warehouse we quote: Soft steel bars, 3.15c. per lb.; iron bars, 3.15c.; structural shapes, 3.25c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 3.90c.; No. 28 black sheets, cold rolled, one pass, 4.65c.; cold rolled rounds, shafting and screw stock, 3.95c.; structural rivets, 2.45c.; boiler rivets, 3.85c.; tank rivets, ½ in. diameter and smaller, 70 per cent off list; machine bolts, 55 per cent; carriage bolts, 50 per cent; lag screws, 60 per cent; hot pressed nuts, square, \$3.50; hexagons, blank or tapped, \$4 off list.

Coke.—Industrial coke is in better demand, and foundries are urging shipments against contracts. Most of the business is being done by the by-product ovens in the district. The demand for domestic coke is light, lack of cold weather and competition from fuel oil burners being the cause.

Old Material.—Dealers in St. Louis of old material are busily engaged in covering a contract for 10,000 tons of steel specialties, placed by an East Side concern for delivery within the next 60 days. The market for these items is higher. There is a good demand for all steel grades, and several large lots of steel rails have been sold. Relaying rails are in very good demand by lumber and other industrial concerns, one dealer reporting 22 orders in one day.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	\$18.00 to \$18.50
Rails for rolling	18.50 to 19.00
Steel rails, less than 3 ft.	19.00 to 19.50
Relaying rails, 60 lb. and under ..	25.00 to 26.00
Relaying rails, 70 lb. and over ..	32.50 to 33.50
Cast iron car wheels	18.50 to 19.00
Heavy melting steel	16.50 to 17.00
Heavy shoveling steel	16.25 to 16.75
Frogs, switches and guards cut apart	18.00 to 18.50
Railroad springs	20.50 to 21.00
Heavy axles and tire turnings ..	12.50 to 13.00
No. 1 locomotive tires	18.00 to 18.50
Per Net Ton	
Steel angle bars	15.50 to 16.00
Steel car axles	20.00 to 20.50
Iron car axles	24.00 to 24.50
Wrought iron bars and transoms ..	19.50 to 20.00
No. 1 railroad wrought	14.75 to 15.25
No. 2 railroad wrought	14.50 to 14.75
Cast iron borings	10.75 to 11.25
No. 1 busheling	14.75 to 15.25
No. 1 railroad cast	17.50 to 18.00
No. 1 machinery cast	18.50 to 19.00
Railroad malleable	14.50 to 15.00
Machine shop turnings	8.00 to 8.50
Champion bundled sheets	10.00 to 10.50

Buffalo

The \$22 Price on Pig Iron Fairly Well Established—Scrap Advances

Pig Iron.—The \$22 base price seems to be fairly well established for first quarter, with two of the furnaces naming \$23 as their lowest figure for last quarter. An important maker here is quoting dollar differentials on these bases. Very little iron is now available for the last quarter, one of the furnaces being out of the market entirely and having only about 10,000 tons available for first quarter. Another furnace is asking \$22.50 for last and first quarter and the \$23 price on first quarter iron has bobbed up, but to a limited extent. The inquiry for the week was about 5000 tons exclusive of a rather sizable tonnage of basic which was before the market. Of the 5000 tons, a central New York inquiry for 1000 tons for first quarter delivery was the largest. Most of the inquiry is for one and two-carload lots with the little consumers buying rather heavily. Indications are that foundries are headed for increased operation.

We quote prices f.o.b. gross ton, Buffalo, as follows:

No. 2 plain, sil. 1.75 to 2.25	\$22.00 to \$23.00
No. 1 foundry, sil. 2.75 to 3.25	23.50 to 24.50
No. 2 foundry, sil. 2.25 to 2.75	22.50 to 23.50
Malleable, sil. up to 2.25	22.00 to 23.00
Basic	22.00 to 23.00
Lake Superior charcoal	29.28

Finished Iron and Steel.—With a disposition by the jobbers to contract for future requirements, mills are getting into better business, this being noticeable especially in bars and structural shapes, which are firm at the delivered price of 2.365c. Reports of a further increase in this price are current. Sheets are strong at 3.60c. and 4.75c. with the big users pretty well covered. A 600-ton inquiry for black noted last week was placed. Bolt prices have been advanced to 50-10-10 off for large machine for first quarter delivery. Other classifications have been advanced in proportion. Pipe demand is better and mostly for butt-weld. A local fabricator has taken 600 tons of structural steel for an addition to a local sheet mill. Reinforcing bar business has fallen off slightly.

Steel bars, 3.30c.; iron bars, 3.35c.; reinforcing bars, 3.30c.; structural shapes, 3.40c.; plates, 3.40c.; No. 10 blue sheets, 4.05c.; No. 28 black sheets, 4.75c.; No. 28 galvanized sheets, 5.85c.; bands, 4.05c.; hoops, 4.40c.; cold-finished rounds, 4.20c.; cold-finished shapes, 4.70c.

Old Material.—Local mills apparently have satisfied the greater part of their requirements until some time after Jan. 1, a recent sale of heavy melting steel at \$20 having taken two of them out of the market. Dealers say that it would be impossible to buy a tonnage of heavy melting steel just now under \$20, though one of the mills will pay no higher than \$17.50. That is its offering price, though it is getting very little tonnage at this figure. Outside mills in Youngstown and Pittsburgh districts are seeking scrap briskly, but a \$21 market in those two localities is not sufficient to pull much material out of the Buffalo district. Dealers are paying \$19 in cases where they have orders at that figure. Malleable market has improved and consumers are paying \$21 to \$21.50. No. 1 busheling and hydraulic compressed are both active and selling from \$1 to \$1.50 under heavy melting steel. Cast is picking up a little, but no real sales have been made. Cast is probably worth \$18.50, dealers say. A lively demand for turnings and borings exists, with outside markets in Cleveland and Pittsburgh, willing to pay \$16.50 to \$17 delivered. The effect of the arrangement which takes the New York Central scrap out of this market in entirety is especially apparent at this time. This wholesale dent in the Buffalo market means less business for Buffalo dealers and higher prices for mills.

We quote f.o.b. gross ton, Buffalo, as follows:

Heavy melting steel	\$19.00 to \$19.50
Low phosphorus, 0.04 and under ..	20.50 to 21.00
No. 1 railroad wrought	16.50 to 17.00
Car wheels	17.50 to 18.00
Machine shop turnings	13.75 to 14.25
Cast iron borings	14.50 to 15.00
No. 1 busheling	17.50 to 18.00
Stove plate	15.50 to 16.50
Grate bars	14.50 to 15.00
Bundled sheets	12.50 to 13.00
Hydraulic compressed	17.50 to 18.00
Railroad malleable	17.50 to 18.00
No. 1 machinery cast	18.00 to 18.50

Birmingham

Some Sales of Pig Iron Made on Basis of \$20—Sanitary Pipe Advances

BIRMINGHAM, ALA., Dec. 9.—On quotations based on \$20 per ton, for No. 2 foundry, Southern furnace companies are still able to sell a little pig iron into the first and second quarters of the coming year. Two of the active and larger producers of iron are still out of the market and others are manifesting caution in taking on business for certain grades because of apprehension as to ability to fill. Inquiries continue briskly. Louisville and the Chicago and St. Louis territories are among the sections in the market for iron. The buying has simmered down some but the market is considered strong, inasmuch as every day or so indications come that there will be need for more iron. The aggregate business booked during the last three weeks of November and the first of December will more than cover the probable make of the first three months of the coming year. Industries melting pig iron will lose but little time during the holidays, so far as the Birmingham district is concerned. The American Cast Iron Pipe Co. will be idle a week, but the labor will be compensated as usual.

We quote per gross ton, f.o.b. Birmingham district furnace as follows:

No. 2 foundry, 1.75 to 2.25 sil.	\$20.00
No. 2 foundry, 2.25 to 2.75 sil.	20.50
Basic	\$19.50 to 20.00
Charcoal, warm blast	29.00 to 30.00

Steel.—Small shapes of steel are in strong demand and production in the Birmingham district is to be improved as warehouse stock is being worked out. Gulf States Steel Co. will have cleared its surplus stock, according to reports, by Feb. 1. The finishing department of this company's mills is working around 85 per cent and the 50 per cent operation of the open-hearth furnaces will be increased shortly. The company has a good stock of basic iron on hand for the open-hearth furnaces. Steel bars are quoted at 2.25c. to 2.30c. Birmingham.

Cast Iron Pipe.—Cast iron sanitary pipe has taken on a \$5 per ton advance in price, with the demand showing more activity. Gas and water pipe trade is good for this season of year and production is being maintained with shipments equal to output. Quotations are around \$38 to \$39 on 6-in. or over. The McWane Cast Iron Pipe Co. announces plans of expansion to materially increase the make of 1½ to 6-in. gas and water pipe. Sanitary pipe plants are melting more iron than for several months.

Coke.—Quotations are firmer and sales are \$5 to \$5.25 per ton, an advance over the prices obtaining a few weeks since. Independent producers are selling liberally at home and out of the territory. The Alabama By-Products Corporation will have an additional 25 ovens completed by March 1. Transportation facilities are greatly improved, with prospects of all cars needed for handling of coke.

Old Material.—Decidedly improved condition of scrap market is announced, though all business is of 30 days' variety; that is, delivery stipulated within 30 days. Immediately after inventory time, belief is that contracts will be taken on which will call for a great tonnage. Yard forces are being maintained by dealers, but no speculative buying is being done. Quotations have advanced and delivery is being urged during this month.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Cast iron borings, chemical.....	\$15.00 to \$16.00
Heavy melting steel	14.00 to 14.50
Railroad wrought	13.00 to 14.00
Steel axles	17.00 to 18.00
Iron axles	19.00 to 19.50
Steel rails	14.00 to 14.50
No. 1 cast	16.00 to 17.00
Tramcar wheels	16.00 to 17.00
Car wheels	15.00 to 16.00
Stove plate	14.00 to 15.00
Machine shop turnings	7.00 to 8.00
Cast iron borings	7.00 to 8.00
Rails for rolling	15.00 to 16.00

San Francisco

Current Business Substantial—Structural Material Active—Market Firm

SAN FRANCISCO, Dec. 5 (*By Air Mail*).—The Pacific Coast iron and steel market continues to improve. Awards made during the past week for structural steel exceeded 13,753 tons, and jobs pending call for at least 21,427 tons. Buying of pig iron continues fairly active, although it is not so strong as it has been, primarily because buyers have placed orders to cover their requirements for the next two to three months.

The general undertone of the market is healthy, although there seems to be a feeling in many places that "sentiment is better than business," or, in other words, that buyers, in some instances, have been inclined to overemphasize the importance of the Presidential election and the upward movement of the stock market. It is, however, true, that the steel market on the Pacific Coast is, generally, on a more satisfactory basis than it has been in several months.

Pig Iron.—Although buyers, for the most part, have covered their requirements for the next two to three months, the number of inquiries reported during the past week lends strength to the belief that a fairly substantial volume of business is still to be transacted. An inquiry from a Los Angeles concern for 1000 tons, during the past week was, however, the largest reported. Sellers of domestic pig iron have revised their quotations as follows:

	Per Ton
Utah basic furnace.....	\$23.00
Utah foundry, sil. 1.75 to 2.25, furnace	23.00
*Scotch foundry	\$26.00 to 28.00
*English foundry	25.50 to 30.00
*Belgian foundry	26.00 to 28.00
*Dutch and German iron.....	26.00 to 28.00
*Indian iron	26.00 to 28.00
Birmingham, Ala., foundry iron, sil. 2.75 to 3.25, delivered in San Francisco	29.75

*Duty paid, shipside, San Francisco.

Bars.—Activity, on the part of buyers, for reinforcing bars continues. Awards during the past week for reinforcing bars exceed 3030 tons. Awards of the week include the following:

Department store, Fulton and Tulare Streets, Fresno, 250 tons to Edw. L. Soule Co.

Two bridges over Kearn River, Bakersfield-Rosedale road, 1400 tons, to American System Reinforcing Co.

Apartment house, Vallejo and Laguna Streets, San Francisco, 100 tons, W. S. Wettenhall Co.

Schmidt Lithograph Co., Second and Bryant Streets, four-story addition, 600 tons, to Edw. L. Soule Co.

Twelve-story apartment house, adjoining the Municipal Museum, Oakland, 500 tons, to Gunn, Carle Co.

California Packing Co. plant, Sacramento, 180 tons, to Truscon Steel Co.

Jobs pending involve about 500 to 1000 tons.

Sheets.—Demands for sheets are somewhat more conservative. Current quotations are as follows: blue annealed, 3.43c. c.i.f., black, 4.33c. c.i.f., galvanized, 5.48c. c.i.f.

Tin Plate.—An order was placed for 60,000 base boxes during the past week with an independent mill in the Chicago market by Libby, McNeil & Libby for delivery in Seattle at the current quotation of \$5.50. Recent business on the coast has been substantial.

Plates.—Although the prevailing quotations are 2.40c. to 2.45c. base, c.i.f., 2.35c. is still obtainable. The Matson Navigation Co. has entered the market with an inquiry for 8000 tons for a new Matson liner to ply between San Francisco and Honolulu. Several other inquiries are still pending.

Structural Material.—Awards for structural steel amounting to 13,753 tons were made during the past week, and at least 21,427 tons is pending. The prevailing quotations are 2.45c. to 2.55c. base, c.i.f., although 2.35c. or lower can still be obtained in some places. Quotations on foreign shapes are about 2.10c. c.i.f., although a lower price is sometimes mentioned.

Coke.—Orders are moderate but buyers are fairly well covered for the next two months. English coke, foundry grade, is being offered at \$16.50 to \$18, f.o.b. cars, shipside, duty paid. Birmingham, Ala., by-product is quoted at \$18 to \$20 delivered. West Virginia, beehive, is \$25 to \$27 delivered.

Old Material.—The market for scrap is sluggish but fairly firm. Local furnaces are well supplied for all current requirements. Stocks on hand in yards are ample.

Prices for scrap delivered to consumers' yards are as follows:

	Per Gross Ton
No. 1 heavy melting steel.....	\$11.00 to \$12.00
Scrap rails, miscellaneous.....	11.00 to 12.00
Rolled steel wheels.....	11.00 to 12.00
Couplers and knuckles.....	11.00 to 12.00
Mixed borings and turnings.....	6.00 to 6.50
Country mixed cast scrap.....	8.50 to 9.00

Detroit Scrap Firm

DETROIT, Dec. 9.—The Detroit market on old material is still firm with no indications that there will be any falling in prices over the remainder of the year. Melting conditions are good and probably on a higher tonnage than during November. Prices are the same as quoted a week ago.

The following prices are quoted on a gross ton basis f.o.b. producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting steel	\$16.50 to \$17.00
Shoveling steel	16.50 to 17.00
Borings	13.50 to 14.00
Short turnings	13.50 to 14.00
Long turnings	13.00 to 13.50
No. 1 machinery cast	17.00 to 18.00
Automobile cast	18.00 to 19.00
Hydraulic compressed	14.00 to 15.00
Stove plate	14.50 to 15.50
No. 1 busheling	14.50 to 15.00
Sheet clippings	10.00 to 11.00
Flashings	12.50 to 13.50

The Westinghouse Electric & Mfg. Co. recently acquired 65 building lots in Sharon, Pa., and Sharpsville, Pa., on which it plans to build next spring dwellings for its employees in the Shenango Valley.

Cincinnati

Southern Furnace Advance Price of Pig Iron to Basis of \$20

CINCINNATI, Dec. 9.—The sold up condition of Southern furnaces is reflected by another advance of \$1 a ton for all deliveries, the market in Tennessee and Alabama now being quoted at \$20, Birmingham basis. One or two furnaces in Alabama are reported to have booked all their probable make for first quarter, while several are out of the market on the low silicon grades. In the southern Ohio district, the price ranges from \$21.50 for prompt shipment to \$22 for first quarter. Some Valley furnace competition at \$20.50 is being encountered on the outskirts of the territory. Sales continue generally for carload lots up to 200 tons, but there have been a few of round tonnages. A northern Ohio melter bought 1000 tons of malleable at \$20.50, Valley, while another Northern melter took 800 tons of Southern last week at \$19.50, Birmingham. Other sales included 1000 tons of southern Ohio iron for prompt shipment at \$21.50, Ironton base, and one of 800 tons at \$22, Ironton, for first quarter. A central Ohio melter bought 500 tons of foundry iron from furnaces in the Valley and southern Ohio districts. It is reported that a nearby steel works interest has purchased 20,000 tons of Southern basic for first quarter shipment, but confirmation is lacking. Norton furnace at Ashland, Ky., will blow in this month on foundry or Bessemer grades.

Based on freight rates of \$4.05 from Birmingham and \$2.27 from Ironton we quote f.o.b. Cincinnati:

Southern fdy., sil. 1.75 to 2.25 (base)	\$24.05
Southern fdy., sil. 2.25 to 2.75	24.55
Southern Ohio silvery, 8 per cent. \$31.77 to 32.77	
Southern Ohio fdy., sil. 1.75 to 2.25	23.77 to 24.27
Southern Ohio, basic	23.27
Southern Ohio, malleable	23.77 to 24.27

Semi-Finished Materials.—The Andrews Steel Co. has opened books for first quarter at \$39 for rerolling billets, \$40 for sheet bars, and \$43.50 for forging billets, f.o.b. Newport, Ky.

Sheets.—Present demand is mostly of the fill-in variety, consumers having covered for part of their first quarter needs before the higher prices were named. Much of this tonnage will be shipped this month. Practically all the mills are now quoting 2.70c. for blue annealed, 3.60c. for black, and 4.75c. for galvanized, f.o.b. Pittsburgh. There are still some quotations of 2.60c., 3.50c. and 4.60c. outstanding for December shipment, however. The Newport Rolling Mills Co. has opened its books for first quarter at prices similar to those named by the leading producer.

Tin Plate.—Southern can manufacturers have been active buyers of tin plate during the past week, one company reporting having received the equivalent of 110 carloads for first half delivery. Prices are steady at \$5.50 per base box, Pittsburgh.

Reinforcing Bars.—Small jobs predominate, with tonnage running to a fair aggregate. The largest letting reported was 100 tons for the Woolworth building, Cincinnati, to Bourne-Fuller Co. Inquiries pending include 400 tons for an addition to Christ Hospital, Cincinnati; 300 tons for an addition to Bethesda Hospital, Cincinnati; and 400 tons for the new Masonic Home at Louisville, Ky. Prices are steady at 1.95c., mill, for rail steel bars, to 2.10c., Pittsburgh, for new billet steel.

Structural Activity.—This district appears to be lagging behind the rest of the country in the matter of structural activity. The only inquiry of consequence is for 500 tons for a new Knights of Columbus building at Columbus, Ohio. There were no lettings of importance. Pending business includes 1200 tons for an addition to a hotel at Knoxville, and 1500 tons for an office building at Houston, Texas, but bids have not been asked.

Cast Iron Pipe.—Hamilton County Commissioners, Cincinnati, will open bids Dec. 19 on 59,000 ft. of 6-in.

class C water pipe, and 9000 ft. of 8-in. class B water pipe.

Plant Operations.—Steel works operations are gaining. Sheet mills in the district are now operating at about 90 per cent, while the producing end is at 80 per cent. Blast furnace operations are unchanged.

Warehouse Business.—Demand for reinforcing bars and plates is considerably improved over previous weeks, and other products are holding up well. In fact, jobbers report business to date this month heavier than for the similar period in November. Prices are steady.

Cincinnati jobbers quote: Iron and steel bars, 3.30c.; reinforcing bars, 3.30c.; hoops, 4.35c.; bands, 3.95c.; shapes, 3.40c.; plates, 3.40c.; cold-rolled rounds, 4.05c.; cold-rolled flats, squares and hexagons, 4.55c.; open-hearth spring steel, 4.75c. to 5.75c.; No. 10 blue annealed sheets, 3.90c.; No. 28 black sheets, 4.60c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, \$3.15 per 100 lb.; common wire nails, \$3.15 per keg base; cement coated nails, \$2.85 per keg.

Finished Materials.—Buying during the past week was confined to small tonnages, though the aggregate was fairly heavy. Many of the consumers took advantage of the opportunity afforded to cover for their requirements for the next two months before prices advanced, and as a result are not in a great hurry to cover their needs for the full first quarter. Prices are steady. Plates generally are quoted at 1.90c., Pittsburgh, though there are reports of 1.85c. still being available for immediate shipment. Some mills, however, are quoting 1.95c. and at least one will not accept less than 2c. For bars and structural shapes, the price for first quarter is steady at 2.10c., though some small sales have been made for December shipment on the basis of 2c., Pittsburgh. There is a fair demand for wire products, and prices are firm at 2.60c. for plain wire and \$2.85 per keg, Pittsburgh, for wire nails. Reports are current that the Ohio River rate on wire nails from Ironton to Cincinnati, now 14c. per keg, will be withdrawn and a higher one substituted. There is only a fair demand for bolts and nuts, and there has been little contracting for first quarter. Track accessories are in fair demand. Inquiries for light rails run to carload lots, but prices are stronger, quotations now ranging from 1.80c. to 1.90c., Pittsburgh. Buying of hoops and bands, which had been heavy, has subsided. Prices are firm at 2.40c., Pittsburgh.

Coke.—Demand for furnace and foundry grades is not active, though Norton Iron Works, Ashland, Ky., closed for first quarter needs with a by-product producer. Prices are steady. Wise County furnace is quoted at \$3.90, and foundry \$4.50 to \$6, ovens; New River foundry is quoted \$8.50; Connellsville furnace coke, \$3.50; foundry, \$4.50 to \$5.50; Pocahontas furnace, \$4, and by-product foundry, \$6.50, Connellsville basis.

Old Materials.—The market is marking time. Steel works interests are willing to buy, but their ideas of prices do not coincide with those of dealers. So actual transactions are light. Dealers are holding for higher prices, and apparently are willing to wait till they get them. There has been very little demand for foundry grades. Prices are firm and unchanged.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton	
Heavy melting steel	\$15.50 to \$16.00
Scrap rails for melting	14.50 to 15.00
Short rails	18.00 to 18.50
Relaying rails	30.00 to 30.50
Rails for rolling	16.00 to 16.50
Old car wheels	14.50 to 15.00
No. 1 locomotive tires	17.00 to 17.50
Railroad malleable	16.50 to 17.00
Agricultural malleable	15.00 to 15.50
Loose sheet clippings	12.00 to 12.50
Champion bundled sheets	13.00 to 13.50
Per Net Ton	
Cast iron borings	11.00 to 12.00
Machine shop turnings	10.50 to 11.00
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	16.00 to 16.50
Iron axles	22.00 to 22.50
No. 1 railroad wrought	12.50 to 13.00
Pipes and flues	9.00 to 9.50
No. 1 busheling	11.00 to 11.50
Mixed busheling	9.00 to 9.50
Burnt cast	11.50 to 12.00
Stove plate	11.50 to 12.00
Brake shoes	13.00 to 13.50

Cleveland

Bolt and Nut Manufacturers Change Method of Quoting Prices

CLEVELAND, Dec. 9.—Bolt and nut manufacturers have made a radical change in quoting prices, abandoning Pittsburgh, Chicago and Cleveland as basing points and substituting instead f.o.b. factory prices with freight allowed to destination within certain territorial limits.

Under the zone system full freight, whether carload or less than carload, is to be allowed on shipments of 1000 lb. or over (except on stove and tire bolts, on which full freight allowance is made on 300 lb. and over) within the territory bounded by the following limits:

A line drawn from Milwaukee, Wis. to Dubuque, Iowa.

All cities on or east of the Mississippi River from Dubuque to Cairo, Ill.

All cities on or north of the Ohio River from Cairo to Ironton, Ohio.

All cities on or north of the main line of the Norfolk & Western Railroad from Ironton to Norfolk, Va.

Michigan with the exception of the upper peninsula is included in the full freight allowance zone.

Full freight is to be allowed to New York, Philadelphia and Baltimore on Pacific, Atlantic and Gulf Coast shipments by water from those ports. During the season of Lake navigation, freight to Duluth, St. Paul and Minnesota is to be allowed.

On shipments beyond the zone limits designated above, freight is to be allowed to the natural gateway where the shipments cross the zone line.

The plan is somewhat similar to the one that prevailed before the war, when bolt makers granted a 20c. freight allowance. Consumers beyond the zone are allowed freight to the zone limits, but must pay the additional freight beyond the zone line. The bulk of the bolts and nuts is consumed in the freight allowed zone that has been established. The plants of all but three of the bolt and nut manufacturers are within the full freight allowed zone. With the adoption of the new price system, two sets of prices have been placed in effect on leading items with a 5 per cent differential. It is the intention to allow the larger discount to buyers of several carloads or who place contracts for a quarter for about one carload per month. The new prices are 10 to 15 per cent higher than those that have been prevailing. The freight that is to be paid by the producer is figured at 7 to 8 per cent, so that the new discounts mean a price advance of 2 to 3 per cent to large buyers and 7 to 8 per cent to the smaller buyers. It is pointed out that the new price arrangement will have a tendency to localize the bolt and nut business, as it will be to the interest of makers to sell their output to consuming points having the lowest freight rates and the plan will be carrying out the intention of the Federal Trade Commission when it eliminated the Pittsburgh basing point for steel. Recently Pittsburgh and Chicago have been general basing points for bolts and nuts and Cleveland a basing point for Cleveland delivery only. Bolt and nut makers are starting to quote prices for the first quarter under the new schedules and zone system and it will take some time to determine how the plan will work out.

Pig Iron.—The market was less active the past week than for some time, the recent buying movement having pretty well subsided. However, 30,000 to 35,000 tons of pig iron was sold by Cleveland interests during the week, nearly all in foundry grades, for the first quarter. The buying was done mostly by smaller foundries, as the larger consumers had previously covered. Sales included a 3000-ton and a 2000-ton lot to Cleveland automobile and jobbing foundries. Some foundries that recently bought first quarter iron have come into the market for additional iron for the same delivery. One producer still has inquiries aggregating 20,000 tons. Prices are firm. One Cleveland maker has advanced its price 50c. a ton to \$21.50 at furnace for foundry iron, but another is still quoting the old price. The Cleveland price for outside shipments is unchanged at

\$21. While there is probably some Valley iron still to be had at \$20.50, the more common Valley quotation is now \$21 and considerable iron was sold in Cleveland during the week at \$21 for shipping to points where Valley competition had to be met with equal furnace rates. One Valley producer continues to quote \$22. In Michigan \$21.50 is the usual price. Basic iron is inactive with \$20.50 probably the minimum that furnaces will quote and some holding to \$21. Alabama makers advanced Southern foundry iron to \$20 during the week and this was followed Monday by a similar advance by Tennessee furnaces. In spite of the approaching inventory time, shipping orders are coming out in good volume.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a \$3.02 freight rate from Jackson and \$6 rate from Birmingham:

Basic, Valley furnace	.....	\$20.50 to \$21.00
N'th'n No. 2 fdy., sil.	1.75 to 2.25	21.50 to 22.00
Southern f'dry., sil.	1.75 to 2.25	26.01
Malleable	.....	21.50 to 22.00
Ohio silvery, 8 per cent	.....	\$1.53 to \$1.55
Stand. low phos., Valley furnace	.....	23.00 to 23.50

Semi-Finished Steel.—Additional business in sheet bars placed with a local mill and actively pending aggregates 20,000 tons. The mills are now virtually sold up for the first quarter, most of the business being taken subject to trade paper prices. A 200-ton lot of billets was sold during the week at \$39.50, Pittsburgh, or \$1 a ton below the ruling market, but later one mill advanced its price to \$42.

Sheets.—While the current demand for sheets is moderate, sales have been fairly heavy for the first quarter, but most of the business was booked before the price advance. Although the market is firmer, orders for early shipment can still be placed at 3.50c. for black, 2.60c. for blue annealed and 4.60c. for galvanized sheets. Auto body sheets can still be purchased at 4.60c., although most mills are holding to 4.75c.

Strip Steel.—Wide strip steel continues somewhat irregular, with quotations as low as 2.15c. Hoops are firm at 2.60c. and bands at 2.50c., or about \$2 a ton above recently prevailing prices, and some mills are getting as high as 2.75c. for narrow strip in hoop sizes. Efforts to put cold-rolled strip on a \$3 a ton higher basis so far have been unsuccessful, 4c. still being the more common price.

Warehouse Business.—Local jobbers have advanced cold-rolled steel \$2 a ton, following the recent advance in mill prices. Warehouse business in most lines is good.

Finished Material.—New demand for steel, particularly for steel bars, is holding up remarkably well, considering the recent heavy buying, although a number of mills booked little business during the week, as they have about all their customers under cover. If all the material under contract is specified against, several mills will be comfortably filled through the entire first quarter. What is declared to be the conspicuous feature of the recent buying movement is the absence of speculative buying. Specifications are coming out in good volume, although many consumers are holding back with a view of getting deliveries early in January, so that they can keep their stocks as low as possible at inventory time. Some mills are warning their trade that with the large order books they may be disappointed in securing early January deliveries unless they get their specifications in promptly. Prices are firmer on most lines. Another Lake boat has been placed, this being a 600-ft. freighter ordered by the Cleveland-Cliffs Iron Co. from the Great Lakes Engineering Works. This will require 5000 tons of steel which has been placed with an independent mill. The American Shipbuilding Co. has taken a contract for lengthening a freight boat that will require 900 tons of steel. The plates required aggregating about 600 tons will be supplied by a Cleveland mill. While automobile companies are following a conservative policy in placing steel contracts for future requirements, one leading car builder during the week placed 8000 tons, mostly in steel bars. A cold-drawn steel manufacturer who recently made a heavy purchase of steel bars placed 1000 tons additional. Inquiry in the structural

field continues heavy. One fabricator is now figuring on three or four new inquiries aggregating 15,000 tons. Other inquiries include 4000 tons for a Pennsylvania Railroad bridge at Steubenville, Ohio, and 1200 tons for a power house, bins and trestles for the blast furnace plant of the Central Steel Co., Massillon, Ohio. The New York Central Railroad has issued an inquiry for about 2500 tons of steel for its first quarter requirements, for which bids will be received Dec. 19. The inquiry includes 1000 tons of bars, plates and shapes, 250 tons of sheets, 150 tons of billets, 1500 axles and 15,000 boiler tubes. The Wheeling & Lake Erie Railroad is inquiring for 1700 tons of rails and the 20,000-ton rail inquiry of the Nickel Plate is active.

Jobbers quote steel bars, 3.10c.; plates and structural shapes, 3.20c.; No. 28 black sheets, 4.35c.; No. 28 galvanized sheets, 5.45c.; No. 10 blue annealed sheets, 3.45c. to 3.60c.; cold-rolled rounds, 4c.; flats, squares and hexagons, 4.50c.; hoops and bands, 1 in. and wider and 20 gage and heavier, 3.85c.; narrower than 1 in., all gages, 4.35c.; No. 9 annealed wire, \$3.15 per 100 lb.; No. 9 galvanized wire, \$3.60 per 100 lb.; common wire nails, \$3.25 base per 100 lb.

Steel Bars, Plates and Structural Material.—The plate market has stiffened and 1.90c., Pittsburgh, now appears to be the minimum price. Steel bars and structural material are commonly quoted at 2.10c., at which mills are finding no difficulty in booking orders. An independent mill has advanced screw stock to 2.85c., Cleveland, following the recent advance by the American Steel & Wire Co.

Rivets.—Specifications on contracts have improved materially. Makers have not yet opened their books for first quarter contracts, but expect to do so in a few days and are talking of a price advance of from \$2 to \$3 a ton.

Iron Ore.—The season in navigation closed with less iron ore on the docks Dec. 1 than on the same date a year ago. The amount on Lake Erie docks Dec. 1 was 8,049,276 gross tons, as compared with 8,756,506 tons on Dec. 1 last year. Receipts at Lake Erie ports during the season were 31,534,493 tons, as compared with 43,599,050 tons during the 1923 season. Shipments from Lake Erie ports during the season were 22,108,509 tons, as compared with 32,662,186 tons during the same period last year. Lake front furnaces on Lake Erie ports received during the year 7,610,627 tons, as compared with 9,158,453 tons in 1923. Receipts at other than Lake Erie ports were 10,630,792 tons, as compared with 14,656,472 tons in 1923. The principal receiving ports outside of Lake Erie were Chicago with 4,533,707 tons, Gary with 3,093,427 tons, Indiana Harbor with 1,553,600 tons and Detroit with 826,369 tons.

Coke.—The foundry coke market is firm with some grades 25c. a ton higher than a week ago. Quotations on standard Connellsville foundry coke range from \$4.50 to \$5.50, some of the higher priced brands being offered for the first quarter and half at the same prices. Wise County foundry coke ranges from \$5.50 to \$6.

Old Material.—The market is not active and prices are hardly as firm as they were a week or two ago, although quotations are unchanged. Some consumers would probably buy at the present time, but they are unwilling to pay the prices dealers are asking. Offerings by producers and dealers continue light, but owing to the open weather scrap is moving freely on contracts. There is some demand from dealers, who are offering \$20 for heavy melting steel for Warren delivery and \$18.50 for compressed sheet steel for Youngstown delivery.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	\$18.25 to \$18.75
Rolls for rolling	18.25 to 18.50
Rolls under 3 ft.	20.00 to 20.50
Low phosphorus melting	20.50 to 21.00
Cast iron borings	16.00 to 16.25
Machine shop turnings	15.50 to 15.75
Mixed borings and short turnings	16.00 to 16.50
Compressed sheet steel	15.50 to 16.00
Railroad wrought	16.00 to 16.50
Railroad malleable	19.25 to 19.50
Light bundled sheet stampings	13.75 to 14.00
Steel axle turnings	16.25 to 16.50
No. 1 cast	19.50 to 20.00
No. 1 bushing	15.25 to 16.00
Drop forge flashings	13.75 to 14.00
Railroad grate bars	15.50 to 16.00
Stove plate	15.50 to 16.00
Pipes and flues	14.00 to 14.25

Philadelphia

Upward Price Movement Continues in a Rather Quiet Market

PHILADELPHIA, Dec. 9.—The lull in business occasioned by the approach of the holidays and inventory has about developed into the usual year-end quiet, but prices continue the upward movement that started several weeks ago. Sellers of finished products are still inclined to confine quotations as far as possible to the early part of the first quarter in expectation of further advances. In the meantime the lower quotations that have been trailing in the wake of the price advances are rapidly disappearing. Steel bars are now firm at 2c. to 2.10c., base Pittsburgh; shapes, except on immediate specifications, which might bring out some slight concession, are held at a 2c. per lb. minimum and plates have moved up to 1.90c. minimum, with 2c., base Pittsburgh, firm for the early part of first quarter delivery.

Pig iron is passing through a period of quiet, but prices continue the upward movement with furnaces generally well covered through the first quarter and in some instances with second quarter tonnage on their books. The 50c. differential for silicon has rather generally been dropped and 75c. per ton is now the usual charge with as much as \$1.25 per ton asked between No. 2X and No. 1X. Basic also continues to advance. Cold-rolled shafting is up \$2 per ton to 2.80c. per lb., Pittsburgh.

The advance in bolt and nut prices, expected for several weeks, has been made and at the same time the Pittsburgh basis has been eliminated and prices are on a delivered basis with freight allowed to destination within certain limits.

While the warehouse market continues quiet and slight shading of prices is reported on some products, iron and steel bars and hoops and bands delivered out of stock have been advanced \$2 per ton.

Pig Iron.—A few fair-sized tonnages of foundry iron are reported to have been closed for second quarter or first half delivery, but on the whole the market has entered into the year end period of quiet. Prices, however, continue strong, particularly on foundry grades and basic. While slightly better than \$23 base might be done occasionally with furnaces seeking a backlog, the market is generally firm at \$23 to \$23.50 per ton base. The 50c. differential for silicon has given way with most sellers to a 75c. per ton charge over the base for No. 2X and \$1 to \$1.25 extra for No. 1X. An interesting development in the foreign pig iron situation is the announcement that one importer is bringing in several thousand tons of high silicon iron to be offered in the New England district. A large part of this iron is reported to be equivalent to No. 1X or better, analyzing 3.50 to 4 per cent silicon, 0.50 to 0.90 phosphorus, and can be offered at \$24.75 to \$25 per ton, delivered to consumers not too far removed from the seaboard. Basic continues to advance and \$23 per ton, delivered eastern Pennsylvania, is considered today as the absolute minimum obtainable, with quotations ranging up to \$24 per ton.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76c. to \$1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$23.76 to \$24.63
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.51 to 25.38
East. Pa. No. 1X	25.51 to 26.38
Virginia No. 2 plain, 1.75 to 2.25 sil.	28.17 to 28.67
Virginia No. 2X, 2.25 to 2.75 sil.	28.67 to 29.17
Basic delivered eastern Pa.	23.00 to 24.00
Gray forge	22.50 to 23.00
Malleable	23.00 to 23.50
Standard low phos. (f.o.b. furnace)	25.50 to 26.50
Copper bearing low phos. (f.o.b. furnace)	25.50 to 26.00

Billets.—Inquiry is still light, but prices continue firm, in view of the rapid advance in costs of pig iron and scrap. Forging billets are quoted at \$41 to \$42 per ton, Pittsburgh, for first quarter, and rerolling billets at \$36 for current shipment with \$37 per ton, Pittsburgh, fairly firm for first quarter tonnage.

Bars.—Mills are filling up on steel bars more rapidly than on other forms of finished material and prices are firm at 2c. to 2.10c per lb., Pittsburgh. The 2c. quotation is confined almost exclusively to lots for immediate shipment and some of the larger makers are on a firm 2.10c., Pittsburgh, base for any delivery into the early part of the first quarter. Iron bars are unchanged at 2c. to 2.10c. per lb., Pittsburgh, with the 2c. quotation more easily obtainable than in the case of steel bars.

Shapes.—Fabricators report current business largely confined to small tonnages. Lewis H. Cahan & Co., Philadelphia, have let the contract for a 20-story office and theater building at Broad and Locust Streets to the Lynch Construction Co., New York. Shapes are fairly firm at 2c., Pittsburgh, for first quarter, but immediate specifications might bring out a slight concession from this base.

Plates.—Increases by certain mills in the past week have brought the minimum of the market to 1.90c. per lb., Pittsburgh, for current shipment, with 2c. per lb. firm for the early part of first quarter. While most makers are not inclined to contract for the entire first quarter, it is evident that 2.10c. per lb. represents a fair quotation for contracts extending through the first three months of the year. It is understood that a number of oil storage tanks are included in the plans of the Vacuum Oil Co. for improvements at Paulsboro, N. J.

Bolts and Nuts.—The expected advance in quotations on bolts and nuts amounts to about 5 per cent on some items. The principal feature of the revision of quotations made last week is the change from the Pittsburgh base to a delivered price on lots of 1000 lb. or more. Discounts are given on page 1581.

Old Material.—Although there are rumors of \$21 paid by small consumers of heavy melting steel in eastern Pennsylvania, a fair estimate of the present market seems to be \$19.50 to \$20 per ton. On any new business going to consumers with the usual eastern Pennsylvania freight rate, brokers claim that \$20 is the absolute minimum. In some quarters it is felt that the recent award of the Pennsylvania Railroad list of about 35,000 tons of material on quotations made by a dealer in the Pittsburgh district may have a stiffening effect on the eastern Pennsylvania market. Brokers and consumers were quoting on the 10,000 tons of heavy melting steel included but it is understood to have been obtained on a bid close to \$22, Pittsburgh. Low phosphorus is strong and one sale of a small lot is reported to have been made at \$24.50, delivered eastern Pennsylvania. Borings and turnings are still quiet with the market covering a wide range from \$13.50 per ton, delivered, to a consumer with a low freight rate to as high as \$15 per ton, delivered Birdsboro.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel.....	\$19.50 to \$20.00
Scrap rails	19.00 to 20.00
Steel rails for rolling	20.00
No. 1 low phos., heavy 0.04 and under	23.00 to 24.00
Couplers and knuckles.....	22.50 to 23.50
Roller steel wheels.....	22.50 to 23.50
Cast-iron car wheels	19.00 to 19.50
No. 1 railroad wrought.....	20.00 to 21.00
No. 1 yard wrought	18.00 to 19.00
No. 1 forge fire.....	16.50 to 17.00
Bundled sheets (for steel works)	16.50 to 17.00
Mixed borings and turnings (for blast furnace use).....	13.50 to 15.00
Machine shop turnings (for steel works use)	17.00 to 17.50
Machine shop turnings (for rolling mill use)	17.00 to 17.50
Heavy axle turnings (or equivalent)	17.50 to 18.00
Cast borings (for steel works and rolling mills)	15.50 to 16.00
Cast borings (for chemical plants)	20.00 to 21.00
No. 1 cast.....	19.00 to 19.50
Heavy breakable cast (for steel plants)	17.50 to 18.00
Railroad grate bars	16.50 to 17.00
Stove plate (for steel plant use)	16.50 to 17.00
Wrought iron and soft steel pipes and tubes (new specifications)	17.50 to 18.00
Shafting	25.00 to 25.50
Steel axles	25.00 to 25.50

Warehouse Business.—Transactions are few and there are reports of shading on some materials. Iron and steel bars, however, have been advanced \$2 per

ton to 3.20c. per lb. Hoops are now quoted at 3.95c. per lb. for 1-in. and wider and 4.45c. per lb. for narrower than 1-in. Bands have been advanced to 3.95c. per lb. and rails are quoted at 3.20c. per lb. out of stock.

Soft steel bars and small shapes, 3.20c.; iron bars (except bands), 3.20c.; round edge iron, 3.50c.; round edge steel, iron finished, 1½ x ½ in., 3.50c.; round edge steel planished, 4.30c.; tank steel plates, ¼ in. and heavier, 3.10c.; tank steel plates, ½ in., 3.25c.; blue annealed steel sheets, No. 10 gage, 3.75c.; black sheets, No. 28 gage, 4.85c.; galvanized sheets, No. 28 gage, 6c.; square twisted and deformed steel bars, 2.85c.; structural shapes, 3.10c.; diamond pattern plates, ¼-in., 5.30c.; ½-in., 5.50c.; spring steel, 5c.; round cold-rolled steel, 4.05c.; squares and hexagons, cold-rolled steel, 4.55c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 3.95c.; narrower than 1 in., all gages, 4.45c.; steel bands, No. 12 gage to ½ in., inclusive, 3.95c.; rails, 3.20c.; tool steel, 8.50c.; Norway iron, 7c.

Imports.—In the week ended Dec. 6 a total of 13,666 gross tons of iron ore came into the port of Philadelphia; 6988 tons from Sweden, 572 tons from Germany, and 6000 tons from Algeria. In addition there was 2200 tons of chrome ore from Portuguese Africa, 544 tons of ferromanganese from the United Kingdom, 2758 tons of pig iron from Calcutta, India. A shipment of 11 tons of steel plates was received from Belgium and 16 tons of steel scrap came in from the United Kingdom.

Canadian Scrap Market

TORONTO, ONT., Dec. 8.—Following a fairly brisk demand for iron and steel scrap which lasted for about a week, trading has again fallen off, with conditions of the past few days almost stagnant. During the active period a number of larger melters came into the market with contracts for first quarter but, despite the fact that predictions of advancing prices have been frequent of late, many consumers refuse to cover for any distance into the future. The greater volume of recent buying has been by consumers in the Hamilton district, where the consumption of heavy melting steel and turnings exceeds that of any other district in Ontario. In the Montreal district the demand for scrap has almost entirely disappeared and, with the idea of stimulating business, a few dealers have dropped both their buying and selling prices on some commodities. Where dealers were offering \$18 per net ton for No. 1 machinery cast and \$14 for stove plate two weeks ago, offering prices at the present time are \$17 and \$13 per net ton respectively, Montreal. Up to the present this action has not stimulated business.

Dealers' buying prices are as follows:

	Gross Tons	
	Toronto	Montreal
Steel turnings	\$9.00	\$8.00
Machine shop turnings.....	9.00	7.00
Wrought pipe	6.00	8.00
No. 1 wrought scrap.....	12.00	12.00
Heavy melting steel.....	11.00	11.00
Steel axles	16.00	19.00
Axles, wrought iron	19.00	20.00
Net Tons		
Standard car wheels.....	16.00	17.00
Malleable scrap	14.00	15.00
Stove plate	14.00	13.00
No. 1 machinery cast.....	18.00	17.00

Civil service examinations are announced for associate technologists in connection with petroleum production, for duty with the United States Bureau of Mines, and for junior examiner of trade-marks and designs in the United States patent office. Full information and application blanks may be obtained from the Civil Service Commission, Washington, or from the post office or custom house in any city. Entrance salary for associate technologists is \$3,000; for junior examiner, \$1,860.

The Foote Bros. Gear & Machine Co., Chicago, has made arrangements with Chas. Bond & Co., Philadelphia, for the distribution of IXL gear products and speed reducers in Eastern Pennsylvania and Maryland, Delaware, and all of New Jersey south of Mercer County.

Prices of Finished Iron and Steel Products (Carload Lots)

Tank Plates

F.o.b. Pittsburgh mills, base, per lb.....1.90c. to 2.10c.
F.o.b. Chicago, base, per lb.....2.20c.

Structural Shapes

F.o.b. Pittsburgh mills, base, per lb.....2.10c.
F.o.b. Chicago, base, per lb.....2.20c.

Iron and Steel Bars

Soft steel bars f.o.b. P'gh mills, base, per lb.....2.10c.
Soft steel bars f.o.b. Chicago, base, per lb.....2.10c.
Reinforcing steel bars f.o.b. P'gh mills, base, per lb.....2.10c.
Rails steel bars f.o.b. Chicago district mills, base, per lb...2c.
Common iron bars delivered New York, base, per lb...2.34c.
Common iron bars f.o.b. Chicago, base, per lb.....2c.
Refined iron bars f.o.b. P'gh mills, base, per lb...2.90c. to 3.00c.
Common iron bars delivered Philadelphia, base, per lb...2.32c.

Hot-Rolled Flats

(Pittsburgh)

Hoops, base, per lb.....2.50c.
Bands, base, per lb.....2.40c. to 2.50c.
Hoops and bands, narrower than 1-in., base per lb.....2.75c.
Strips, 10 in. and wider, base, per lb.....2.25c.
Strips, less than 10 in. wide to 3 in.....2.40c.
Strips, 3 in. wide and less, base, per lb.....2.50c.

Cold-Finished Steel

Screw stock and shafting, f.o.b. P'gh mills, base, per lb...2.80c.
Screw stock and shafting f.o.b. Chicago, base, per lb...2.80c.
Screw stock, Worcester mills, base, per lb.....3.00c.
Screw stock, base, per lb. Cleveland.....2.85c.
Shafting, ground, f.o.b. mill, base, per lb.....3.10c.
Strips, f.o.b. P'gh mills, base, per lb.....4.00c. to 4.15c.
Strips, f.o.b. Cleveland mills, base, per lb.....4.15c.
Strips, f.o.b. Chicago mills, base, per lb.....4.45c.
Strips, f.o.b. Worcester mills, base, per lb.....4.30c.

Wire Products

(To jobbers in car lots f.o.b. Pittsburgh and Cleveland)

Nails, base, per keg.....\$2.85
Bright plain wire, base, No. 9 gage, per 100 lb.....2.60
Annealed fence wire, base, per 100 lb.....2.75
Galvanized wire No. 9, base, per 100 lb.....3.20
Galvanized barbed, base, per 100 lb.....3.55
Galvanized staples, base, per keg.....3.55
Painted barbed wire, base, per 100 lb.....3.30
Polished staples, base, per keg.....3.30
Cement coated nails, base, per count keg.....2.25
*Bale ties, carloads to jobbers....75, 15 and 5 per cent off list
*Bale ties, carloads to retailers....75, 10 and 6 per cent off list
Woven wire fence, base, per net ton to retailers.....67.00
Chicago district mill prices are \$2 per ton above the foregoing and Chicago delivered prices are \$3 per ton above the prices f.o.b. Cleveland and Pittsburgh. Birmingham mill prices \$3 a ton higher; Worcester Mass., mills \$3 a ton higher on products of that plant, and Duluth, Minn., mills \$2 a ton higher; Anderson, Ind., \$1 higher.

*F.o.b. Cleveland.

Sheets

Blue Annealed
(base) per lb.

Nos. 9 and 10, f.o.b. Pittsburgh dist. mill.....2.70c.
No. 9 and 10 (base) per lb., f.o.b. Chicago dist. mills...2.80c.

Box Annealed, One Pass Cold Rolled

No. 28 (base) per lb., f.o.b. Pittsburgh dist. mills...3.50c. to 3.60c.
No. 28 (base) per lb., f.o.b. Chicago dist. mill.....3.70c.

Galvanized

No. 28 (base) per lb., f.o.b. Pittsburgh dist. mill.....4.75c.
No. 28 (base) per lb., f.o.b. Chicago dist. mill.....4.85c.

Tin-Mill Black Plate

No. 28 (base) per lb. f.o.b. Pittsburgh dist. mill...3.50c. to 3.60c.
No. 28 (base) per lb., f.o.b. Chicago dist. mills.....3.70c.

Automobile Body Sheets

No. 22 (base) per lb., f.o.b. mill.....4.75c.

Long Ternes

No. 28 (base) 8-lb. coating, per lb., f.o.b. mill.....4.90c.

Tin Plate

Standard cokes, per base box f.o.b. Pittsburgh district Mills.....\$5.50
Standard cokes, per base box f.o.b. Chicago district mills 5.60
Standard cokes, per base box f.o.b. Elwood, Ind.....5.60

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)
8-lb. coating, 100 lb. base.....\$11.20
8-lb. coating I. C.....11.50
15-lb. coating I. C.....14.35
20-lb. coating I. C.....15.50
25-lb. coating I. C.....17.00
30-lb. coating I. C.....18.35
40-lb. coating I. C.....20.35

Rivets

Large, f.o.b. P'gh and Cleveland mills, base, per 100 lb...\$2.60
Large, f.o.b. Chicago mills, base, per 100 lb.....2.75
Small, f.o.b. P'gh and Cleveland mills
70, 10 and 5 per cent off list
Small, f.o.b. Chicago mills.....70, 10 and 5 to 70 and 10 off list

Rails and Track Equipment

(F.o.b. mill)

Rails, standard, per gross ton.....\$43.00
Rails, light, billet, base, per lb.....1.80c. to 1.90c.
Rails, light rail steel, base, per lb.....1.65c. to 1.75c.
Spikes, $\frac{1}{8}$ in. and larger, base, per 100 lb.....\$2.80 to \$2.95
Spikes, $\frac{1}{2}$ in. and smaller, base, per 100 lb.....3.00 to 3.20
Spikes, boat and barge, base, per 100 lb.....3.25
Track bolts, all sizes, base, per 100 lb., P'gh....3.80 to 4.00
Track bolts, all sizes, base, per 100 lb., Chicago...3.90 to 4.10
Tie plates, per 100 lb.....2.35 to 2.50
Angle bars, base, per 100 lb.....2.75

Welded Pipe

(F.o.b. Pittsburgh district mills)

Butt Weld			Iron		
Inches	Steel		Inches	Black	Galv.
	Black	Galv.			
$\frac{1}{8}$	45	19 $\frac{1}{2}$	$\frac{1}{4}$ to $\frac{3}{8}$	+11	+39
$\frac{1}{4}$	51	25 $\frac{1}{2}$	$\frac{1}{2}$	22	2
$\frac{3}{8}$	56	42 $\frac{1}{2}$	$\frac{3}{4}$	28	11
$\frac{1}{2}$	60	48 $\frac{1}{2}$	1 to 1 $\frac{1}{2}$	30	13
$\frac{3}{4}$	62	50 $\frac{1}{2}$			
1 to 3					
			Lap Weld		
2	55	43 $\frac{1}{2}$	2	23	7
2 $\frac{1}{2}$ to 6	59	47 $\frac{1}{2}$	2 $\frac{1}{2}$	26	11
7 and 8	56	43 $\frac{1}{2}$	3 to 6	28	13
9 and 10	54	41 $\frac{1}{2}$	7 to 12	26	11
11 and 12	53	40 $\frac{1}{2}$			
			Butt Weld, extra strong, plain ends		
$\frac{1}{8}$	41	24 $\frac{1}{2}$	2 to 3	61	50 $\frac{1}{2}$
$\frac{1}{4}$ to $\frac{3}{8}$	47	30 $\frac{1}{2}$	$\frac{1}{4}$ to $\frac{3}{8}$	+11	+54
$\frac{1}{2}$	53	42 $\frac{1}{2}$	$\frac{1}{2}$	21	7
$\frac{3}{8}$	58	47 $\frac{1}{2}$	$\frac{3}{4}$	28	12
1 to 1 $\frac{1}{2}$	60	49 $\frac{1}{2}$	1 to 1 $\frac{1}{2}$	30	14
			Lap Weld, extra strong, plain ends		
2	53	42	2	23	9
2 $\frac{1}{2}$ to 4	57	46 $\frac{1}{2}$	2 $\frac{1}{2}$ to 4	29	15
4 $\frac{1}{2}$ to 6	56	45 $\frac{1}{2}$	4 $\frac{1}{2}$ to 6	28	14
7 to 8	52	39 $\frac{1}{2}$	7 to 8	21	7
9 and 10	45	32 $\frac{1}{2}$	9 to 12	16	2
11 and 12	44	31 $\frac{1}{2}$			

To the large jobbing trade the above discounts are increased (on black by one point, with supplementary discount of 5 per cent and (on galvanized) by 1 $\frac{1}{2}$ points, with supplementary discount of 5 per cent.

Note—The above discounts on steel pipe also apply at Lorain and Youngstown, Ohio, and Wheeling, W. Va. Chicago district mills have a base 2 points less. Chicago delivered base 2 $\frac{1}{2}$ points less.

Boiler Tubes

(F.o.b. Pittsburgh)

Lap Welded Steel		Charcoal Iron	
2 to 2 $\frac{1}{4}$ in.	27	1 $\frac{1}{2}$ in.	+18
2 $\frac{1}{2}$ to 2 $\frac{3}{4}$ in.	37	1 $\frac{3}{4}$ to 1 $\frac{1}{2}$ in.	+8
3 in.	40	2 to 2 $\frac{1}{4}$ in.	—
3 $\frac{1}{2}$ to 3 $\frac{3}{4}$ in.	42 $\frac{1}{2}$	2 $\frac{1}{2}$ to 3 in.	—
4 to 13 in.	46	3 $\frac{1}{4}$ to 4 $\frac{1}{2}$ in.	—9

Beyond the above discounts, 5 fives extra are given on lap welded steel tubes and 2 tens on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn		Hot Rolled	
1 in.	55-58	3 and 3 $\frac{1}{4}$ in.	36-39
1 $\frac{1}{4}$ and 1 $\frac{1}{2}$ in.	47-50	3 $\frac{1}{2}$ and 3 $\frac{3}{4}$ in.	37-40
1 $\frac{3}{4}$ in.	31-34	4 in.	41-44
2 and 2 $\frac{1}{4}$ in.	22-25	4 $\frac{1}{2}$ in. and 5 in.	33-37
2 and 2 $\frac{3}{4}$ in.	32-35		

3 and 3 $\frac{1}{4}$ in.	38-41	4 in.	43-46
3 $\frac{1}{2}$ in. and 3 $\frac{3}{4}$ in.	39-42		

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30 base.....85 to 87 per cent off list
Carbon 0.30 to 0.40, base.....83 to 85 per cent off list
Plus usual differentials and extra for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage....	15	2 $\frac{1}{4}$ -in. O.D. 10 gage....	20
2-in. O.D. 11 gage....	16	3-in. O.D. 7 gage....	35
2 $\frac{1}{2}$ -in. O.D. 10 gage....	17	1 $\frac{1}{2}$ -in. O.D. 9 gage....	15
2 $\frac{1}{2}$ -in. O.D. 12 gage....	17	5 $\frac{1}{2}$ -in. O.D. 9 gage....	55
2 $\frac{3}{4}$ -in. O.D. 11 gage....	18	5 $\frac{1}{2}$ -in. O.D. 9 gage....	57

Prices of Iron and Steel Products and Raw Materials

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron.....	\$5.65
Old range non-Bessemer, 51½ per cent iron.....	4.90
Mesabi Bessemer, 55 per cent iron.....	5.40
Mesabi non-Bessemer, 51½ per cent iron.....	4.75
<i>Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore</i>	
Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian.....	9.00c. to 9.50c.
Iron ore, Swedish, average 66 per cent iron Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal.....	9.50c.
Manganese ore, ordinary, 48 per cent manganese from the Caucasus.....	42c.
Manganese ore, Brazilian or Indian, nominal Tungsten ore, high grade, per unit, in 60 per cent concentrates.....	40c.
Chromite ore, basic, 48 per cent Cr ₂ O ₃ , crude, per ton, c.i.f., Atlantic seaboard.....	42c.
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₂ , New York.....	\$8.50
	18.50 to 24.00
	80c.

Coke and Coal

(Per Net Ton)

Furnace coke, f.o.b. Connellsville prompt.....	\$3.50
Foundry coke, f.o.b. Connellsville prompt.....	\$4.50 to 4.75
Mine run steam coal, f.o.b. W. Pa. mines.....	1.50 to 2.10
Mine run coking coal, f.o.b. W. Pa. mines.....	1.75 to 1.90
Mine run gas coal, f.o.b. W. Pa. mines.....	2.00 to 2.25
Steam slack, f.o.b. W. Pa. mines.....	1.10 to 1.30
Gas slack, f.o.b. W. Pa. mines.....	1.40 to 1.50

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton.....	\$105.00
Ferromanganese, foreign, 80 per cent, f.o.b. Atlantic port, duty paid.....	105.00
Ferrosilicon, 50 per cent, delivered.....	75.00 to 82.50
Ferrosilicon, 75 per cent.....	\$140.00 to 145.00
Ferrotungsten, per lb. contained metal.....	87c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered.....	10.75c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr. per lb.....	10.50c.
Ferrovanadium, per lb. contained vanadium Ferrocobaltititanium, 15 to 18 per cent, per net ton.....	\$3.50 to \$4.00
	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated.)

Spiegeleisen, domestic, 19 to 21 per cent.....	\$31.00 to \$33.00
Spiegeleisen, domestic, 16 to 19 per cent.....	30.00 to 32.00
Ferrosilicon, Bessemer, 10 per cent, \$39.50; 11 per cent, \$42; 12 per cent, \$44.50; electric furnace ferrosilicon 10 to 11 per cent, \$38, furnace, with an advance of \$1 per unit for material above 10 per cent.	
Silvery iron, 5 per cent, \$27.00; 6 per cent, \$28.00; 7 per cent, \$29.00; 8 per cent, \$29.00 to \$30.00; 9 per cent, \$32.50; 10 per cent, \$34.50; 11 per cent, \$37.00; 12 per cent, \$39.50.	

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton, f.o.b. Illinois and Kentucky mines.....	\$17.50
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines.....	18.00
Fluorspar, foreign, 85 per cent calcium fluoride, not over 5 per cent silica, c.i.f. Philadelphia, duty paid, per gross ton.....	19.75
Per 1000 f.o.b. works:	
Fire Clay:	
Pennsylvania.....	High Duty \$40.00 to \$43.00 Moderate Duty \$36.00 to \$40.00
Maryland.....	45.00 to 47.00 40.00 to 42.00
Ohio.....	40.00 to 43.00 37.00 to 39.00
Kentucky.....	42.00 to 43.00 37.00 to 39.00
Illinois.....	42.00 to 45.00 37.00 to 42.00
Missouri.....	42.00 to 45.00 35.00 to 40.00
Ground fire clay, per net ton.....	6.00 to 7.00
Silica Brick:	
Pennsylvania.....	36.00
Chicago.....	45.00
Birmingham.....	50.00
Ground silica clay, per net ton.....	8.00
Magnesite Brick:	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.).....	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.).....	40.00
Chrome Brick:	
Standard size, per net ton.....	45.00

Bolts and Nuts

Machine bolts, small rolled threads 60 and 5 to 60 and 10 per cent off list	
Machine bolts, all sizes, cut threads 50, 10 and 5 to 50, 10 and 10 per cent off list	
Carriage bolts, smaller and shorter, rolled threads 50, 10 and 5 to 50, 10 and 10 per cent off list	
Carriage bolts, cut threads, all sizes 50 and 5 to 50 and 10 per cent off list	
Eagle carriage bolts.....	65 and 10 per cent off list
Lag bolts.....	60, 10 and 5 to 60, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads 50 and 5 to 50 and 10 per cent off list	
Other style heads.....	20 per cent extra
Machine bolts, c.p.c. and t. nuts, ¾ x 4 in. 45 and 10 to 45, 10 and 5 per cent off list	

Larger and longer sizes

Hot-pressed nuts, blank or tapped, square 45 and 10 to 45, 10 and 5 per cent off list	
Hot-pressed nuts, blank or tapped, hexagons 2.75c. to 4c. off list	
C.p.c. and t. square or hex. nuts, blank or tapped 4.15c. to 4.40c. off list	
Semi-finished hex. nuts: 3.85c. to 4.10c. off list	
¾ in. and smaller, U. S. S.....	80, 10 and 5 per cent off list
¾ in. and larger, U. S. S.....	75, 10 and 5 per cent off list
Small sizes, S. A. E.....	80, 10, 10 and 5 per cent off list
S. A. E., ¾ in. and larger.....	75, 10, 10 and 5 per cent off list
Stove bolts in packages.....	80 and 5 per cent off list
Stove bolts in bulk.....	80 and 5 and 2½ per cent off list
Tire bolts.....	50, 10 and 5 per cent off list
Bolt ends with hot pressed nuts.....	50, 10 and 5 per cent off list
Bolt ends with cold pressed nuts.....	46 per cent off list
Washers.....	6c. to 6.25c. off list
Lock washers.....	30 per cent off list

The foregoing are delivered prices for 1000 lb. or over, except on stove and tire bolts on which a full freight allowance is made on 300 lb. or over, for shipment within established zone limits, buyers outside of the zone paying the additional freight. Washers and lock washers are quoted f.o.b. Chicago and Pittsburgh.

Semi-Finished Castellated and Slotted Nuts

(F.o.b. Chicago and Pittsburgh)

(To jobbers and consumers in large quantities)

	Per 1000		Per 1000
	S. A. E.	U. S. S.	S. A. E.
¾-in.	\$4.25	\$4.25	¾-in. \$13.25
¾-in.	4.90	4.90	¾-in. 16.25
¾-in.	5.90	6.25	¾-in. 22.50
¾-in.	7.50	8.50	¾-in. 34.00
¾-in.	9.75	10.00	¾-in. 53.00

Larger sizes—Prices on application.

Cap and Set Screws

(F.o.b. shipping point)

Milled hex. cap screws.....	80 and 10 per cent off list
Milled standard set screws, case hardened, 80 and 10 per cent off list	
Milled headless set screws, cut thread, 80 and 10 per cent off list	
Upset hex. head cap screws, U. S. S. thread, 80, 10, 10 and 5 per cent off list	
Upset hex. head cap screws, S. A. E. thread, 80, 10, 10 and 5 per cent off list	
Milled studs.....	75 and 10 per cent off list

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over.....	\$35.50 to \$36.00
Forging billets, ordinary carbons.....	40.50 to 42.50
Sheet bars, Bessemer.....	37.00 to 37.50
Sheet bars, open hearth.....	37.00 to 38.00
Slabs.....	35.50 to 36.00
*Wire rods, common soft, base, No. 3 to ¾-in. 48.00	
Wire rods, common soft, coarser than ¾-in. \$2.50 over base	
Wire rods, screw stock.....	\$5.00 per ton over base
Wire rods, carbon 0.20 to 0.40.....	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55.....	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75.....	7.50 per ton over base
Wire rods, carbon over 0.75.....	10.00 per ton over base
Wire rods, acid.....	15.00 per ton over base
Skelp, grooved, per lb.....	2c.
Skelp, sheared, per lb.....	2c.
Skelp, universal, per lb.....	2c.

*Chicago mill base is \$50. Cleveland mill base, \$48.

Alloy Steel

(F.o.b. Pittsburgh or mill)

S. A. E. Series	Bar
Numbers	100 lb.
2100* (1½% Nickel, 10 to 20 per cent Carbon)...	\$3.00
2300 (1½% Nickel).....	4.75
2500 (5% Nickel).....	\$6.25 to 6.50
3100 (Nickel Chromium).....	3.65
3200 (Nickel Chromium).....	5.50
3300 (Nickel Chromium).....	7.50 to 7.75
3400 (Nickel Chromium).....	6.50 to 6.75
5100 (Chromium Steel).....	3.50
5200* (Chromium Steel).....	7.50 to 8.00
6100 (Chromium Vanadium bars).....	4.25
6100 (Chromium Vanadium spring steel).....	4.25
9250 (Silicon Manganese spring steel).....	3.50
Carbon Vanadium (0.45 to 0.55 Carbon, 0.15 Vanadium).....	4c.
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium).....	4.50
Chromium Molybdenum bars (0.30—1.10 Chromium, 0.25—0.40 Molybdenum).....	4.25
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum).....	3.75
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum).....	4.75 to 5.00

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10-in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4-in. down to and including 2½-in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

FABRICATED STEEL BUSINESS

Railroad Work Noteworthy in 30,000 Tons of Awards and 44,000 Tons of Inquiries

Bookings of fabricated steel work in the past week are large, totaling 30,000 tons, of which 5250 tons was for railroads. Including 17,000 tons for the bridge over Carquinez Straits, California, fresh inquiries call for more than 44,000 tons, with 7000 tons of this for the railroads. Leading items among the awards are the following:

N. & S. Holding Co., Long Island City, N. Y., office building, about 300 tons, general contract to White Construction Co.

New York Central Railroad, four bridges at Depew, N. Y., 600 tons, to Shoemaker Bridge Co.

Columbia University, New York, two buildings, 1600 tons, to McClintic-Marshall Co.

Moses Fox, Hartford, Conn., department store, 750 tons, to Levering & Garrigues Co.

Consolidated Gas Co. of Baltimore, addition to power house at Holtwood, Pa., 200 tons, to Belmont Iron Works.

Hershey Chocolate Co., Hershey, Pa., building, 1700 tons, to McClintic-Marshall Co.

Price Brothers, Montreal, 3000 tons, for the River Bend plant; International Paper Corporation, near Three Rivers, Que., 2000 tons, and Gazette Publishing Co., Montreal, 2400 tons, all to Dominion Bridge Co.

Ajax Mfg. Co., Cleveland, factory building, 350 tons; general contract to H. K. Ferguson Co.

U. S. Engineers, Pittsburgh, gate track for Ohio River dam No. 5, 175 tons, to American Bridge Co.

Central of Georgia Railway, girder spans, 100 tons, to American Bridge Co.

Northern Pacific bridge work, 350 tons, to Milwaukee Bridge Co.

Milwaukee Corrugating Co., addition, 250 tons, to Worden-Allen Co.

Henry Bills Apartment, Milwaukee, 150 tons, to Worden-Allen Co.

Yosemite Valley Railroad, five bridges in Merced Irrigation District, 3600 tons, to United States Steel Products Co.

Elks' Club, Oakland, Cal., 1200 tons, to Judson Mfg. Co.

Elks' Club, Sacramento, 1000 tons, to Palm Iron Works, Sacramento.

Hotel, Jones and Eddy Streets, San Francisco, 500 tons, to Judson Mfg. Co.

Apartment house, Jackson and Steimer Streets, San Francisco, 450 tons, to Judson Mfg. Co.

Subway Terminal Corporation, subway terminal building, Los Angeles, Cal., 4850 tons, to Llewellyn Iron Works.

Woodward & Tiernan Printing Co., St. Louis, Mo., printing plant, 265 tons, to Missouri Bridge & Iron Co.

Argyle Building, Twelfth and McGee Streets, Kansas City, Mo., addition, 232 tons, to Kansas City Structural Steel Co.

City of Kaukauna, Wis., Fox River and Canal bridge, 406 tons, to Worden-Allen Co.

Chicago Y. M. C. A. buildings at Englewood and Austin, 199 tons, to American Bridge Co.

Federal Reserve Bank, vault framing, Denver, Colo., 400 tons, to American Bridge Co.

Denver, Colo., riveted pipe line, 2000 tons, to Thompson Mfg. Co.

Federal Reserve Bank, vault framing, Omaha, Neb., 530 tons, to Omaha Structural Steel Co.

Illinois Central, locomotive erecting and machine shop and power house, Chicago, 585 tons, to American Bridge Co.

Palge-Detroit Motor Car Co., building, Detroit, 124 tons, to Whitehead & Kales.

Mystic Iron Works, buildings and skip hoist in conjunction with blast furnace, Everett, Mass., 1450 tons, to McClintic-Marshall Co.

Prairie Oil & Gas Co., Wortham, Tex., 22 oil storage tanks, 3500 tons, to Chicago Bridge & Iron Works.

Central Steel Co., Massillon, Ohio, blast furnace, 2200 tons, to Riter-Conley Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Garage, 509 West Thirty-fourth Street, New York, 500 tons.

Apartment building, 10 to 22 East Ninety-seventh Street, 1000 tons.

Freeport Telephone Co., Freeport, Long Island, N. Y., building, 200 tons.

Central Railroad of New Jersey, bridge, 200 tons.

Wateree Power Co., Wateree, S. C., power station, 800 tons.

Alexander Hamilton Theater, Passaic, N. J., 900 tons.
Union Institute of Savings, Boston, 500 tons.
Baltimore & Ohio Railroad, four bridges, 1500 tons.
City of Baltimore, building for police headquarters, 1700 tons, all bids rejected.

Southern Railway, bridge, 250 tons.

Knights of Columbus building, Columbus, Ohio, 500 tons, bids being taken.

U. S. Engineers' Office, Cincinnati, 2 steel towboats, 150 tons, bids received until Jan. 8.

Ashtabula, Ohio, lift bridge, 400 tons.

Jamestown, N. Y., viaduct, 1000 tons.

Jackson Shore Hotel, Chicago, 3200 tons.

Ambassador Hotel, Hammond, Ind., 700 tons.

Loew's Theater, New Orleans, 750 tons.

Rock Island Lines, bridge requirements 1925, 1000 tons.

Horseshoe Bend, Idaho, bridge, 150 tons.

Kalamazoo, Mich., office building, 300 tons.

Hubbard Steel Foundry Co., East Chicago, Ind., machine shop, 400 tons.

Carquinez Straits Bridge, San Francisco, 17,000 tons.

United Bank & Trust Co., San Francisco, 150 to 200 tons.

Army and Navy Y. M. C. A. building on the Embarcadero, San Francisco, 1100 tons.

San Diego municipal pier, 650 tons.

Matson Navigation Co., San Francisco, 4000 tons for a new liner to ply between San Francisco and Honolulu.

Pennsylvania Railroad, bridge at Steubenville, Ohio, 4000 tons.

Central Steel Co., Massillon, Ohio, power plant, bins and trestles, 1200 tons.

RAILROAD EQUIPMENT BUYING

New Inquiries for Cars About Equal Purchases— Locomotive Purchases Total 49

Inquiries for cars during the week, amounting to 2592, were about equal to total purchases of 2762 cars. One of the outstanding inquiries was from the Missouri Pacific which asked for a list including divided coaches, mail and baggage cars, mail storage cars, baggage cars, gondola and hopper cars. No inquiries were reported for locomotives, but total purchases of 49 are reported. The Missouri Pacific was the purchaser of 16 of these, the Southern Pacific of 15 and the Florida East Coast of 18.

The Chicago, Indianapolis & Louisville is inquiring for 500 box cars.

The Florida East Coast has purchased 10 10,000-gal. tank cars from the General American Tank Car Corporation and is in the market for 20 caboose cars.

The Cranberry Creek Coal Co., Hazleton, Pa., has purchased 2 30-yd. air operated dump cars from the Clark Car Co.

The Union Railroad Co. has closed on 500 hopper car bodies with the Greenville Steel Car Co.

The St. Louis Southwestern has purchased 1000 box cars from the Mount Vernon Car Co.

The Wabash has awarded 1000 box cars to the American Car & Foundry Co.

The Rock Island has placed 750 refrigerator cars with the Western Steel Car & Foundry Co.

The Chicago & North Western has ordered 12 baggage, 24 coaches and 3 baggage and mail cars from the American Car & Foundry Co. and 11 baggage cars from the Pullman Car & Mfg. Corporation.

The Western Fruit Express has placed 1357 steel underframes with the Ryan Car Co.

The Florida East Coast has awarded 12 coaches and 1 dining car to the Pullman Car & Mfg. Corporation, 12 Mountain type and 6 8-wheel switching locomotives to the American Locomotive Co., 10 tank cars to the General American Tank Car Corporation and is inquiring for 2 caboose cars.

The Louisville & Nashville has placed 8 Mikado type and 8 8-wheel switching engines with the American Locomotive Co. and is inquiring for 1000 gondola cars.

The Missouri Pacific is inquiring for 6 divided coaches, 9 mail and baggage cars, 1 passenger and mail car, 10 mail storage cars, 10 baggage cars, 2 dining cars, 40 caboose cars, 750 gondola cars and 250 hopper cars.

The Southern Pacific has ordered 15 3-cylinder locomotives from the American Locomotive Co.

The Ford Motor Co. is inquiring for 30 caboose cars.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound For Early Delivery

Dec.	Copper, New York		Straits Tin (Spot)		Lead		Zinc	
	Lake	Electro-lytic*	New York	New York	St. Louis	New York	St. Louis	
3.....	14.25	13.87½	54.87½	9.00	8.60	7.35	7.00	
4.....	14.25	13.87½	55.25	9.00	8.60	7.35	7.00	
5.....	14.25	13.87½	54.75	9.00	8.60	7.30	6.95	
6.....	14.25	13.87½	.....	9.00	8.60	7.30	6.95	
8.....	14.25	13.87½	54.87½	9.00	8.60	7.37½	7.02½	
9.....	14.25	13.87½	55.12½	9.00	8.70	7.42½	7.07½	

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Dec. 9.

The markets are moderately active and prices in most cases are firm. Copper quotations are unchanged in only a fairly active market. Buying of tin is spasmodic with the price trend steady. Conditions in the lead market are unaltered. After a recession quotations for zinc are higher.

Copper.—Consumers in general are so well covered for their immediate needs that they are buying only under the most favorable conditions. Sales on some days have been made as high as 14.25c., delivered. There has been some letup in the demand and consequently an easier tone to the market, with metal from some sources available at 14.12½c., delivered. First quarter delivery is probably unobtainable at less than 14.25c., delivered, but there is still some metal offered at 14.12½c., for December and early January, or 30-day delivery. The opinion is quite general in the market that electrolytic copper will not again break below the 14c. level for some time to come, but will gradually approach 15c., with intermittent recessions of about ¼c. Lake copper is quoted at 14.25c., delivered.

Tin.—That consumers still have considerable tin to buy, particularly for February to June delivery, is the opinion of well-informed people in the trade. It is authoritatively predicted that the largest production of tin plate next year will take place in the second quarter. If these facts are true they offer some explanation for the present dullness of the market. It is believed that consumers will buy on all reactions, thus contributing support to the market, but that they will not buy freely nor heavily. From present appearances quotations will fluctuate in the immediate future within narrow limits. There have been further indications of liquidations of bull accounts both here and in London. The market during the past week has been generally dull. The sharp rise in sterling has been the feature and has really kept prices from going lower. During the whole week, ended with Saturday, Dec. 6, about 750 tons changed hands. The market yesterday and today was very quiet, with spot Straits tin quoted today at 55.12½c. and futures at 55.25c. In London prices today were about £4 per ton less than a week ago, with spot standard quoted at £256 10s., future standard £259 12s. 6d. and spot Straits at £259. The Singapore price yesterday was £260 10s. Arrivals thus far this month have been 890 tons, with 7238 tons reported afloat.

Lead.—The only feature of interest has been the advance by the leading interest late yesterday of its contract price from 8.65c. to 8.75c., New York. This has had very little influence on the outside market, in which conditions remain about the same as for the past four weeks. Independents are securing business at about 9c., New York, and at a range of 8.40c. to 9c., St. Louis.

Zinc.—Prices for prime Western zinc eased off slightly during the week, but today are practically back to the level of a week ago. Better buying, particularly for export, has developed in the last day or so and quotations range from 7.05c. to 7.10c., St. Louis, or 7.40c. to 7.45c., New York.

Nickel.—Shot and ingot nickel are quoted unchanged

in wholesale lots at 29c. to 30c. per lb., with electrolytic nickel quoted at 33c.

Antimony.—Demand has fallen off, but the market continues firm at 14.30c. to 14.50c. per lb., duty paid, New York.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 27c. to 28c., delivered.

Old Metals.—Business is good and prices are firm. Dealers' selling prices are as follows in cents per lb.:

Copper, heavy and crucible	13.50
Copper, heavy and wire	12.50
Copper, light and bottoms	11.25
Heavy machine composition	10.50
Brass, heavy	9.00
Brass, light	7.50
No. 1 red brass or composition turnings..	9.25
No. 1 yellow rod brass turnings	9.00
Lead, heavy	8.25
Lead, tea	7.00
Zinc	4.35
Cast aluminum	17.50
Sheet aluminum	17.50

Chicago

DEC. 9.—Tin and zinc have declined but lead has risen as a result of \$4 a ton advance by the leading smelter. Trade in the metals is in good volume, although not so active as a week ago. The old metal prices are unchanged. We quote, in carload lots: Lake copper, 14.50c.; tin, 56c.; lead, 8.95c.; spelter, 7.05c.; in less than carload lots, antimony, 16c. On old metals we quote copper wire, crucible shapes and copper clips, 11.50c.; copper bottoms, 9.75c.; red brass, 9c.; yellow brass, 7.50c.; lead pipe, 7.50c.; zinc, 4.37½c.; pewter, No. 1, 26c.; tin foil, 36c.; block tin, 43c.; all buying prices for less than carload lots.

GASKILL IS OPPOSED

Reappointment of Commissioner Not Favored in Some Quarters—Decisions Recalled

WASHINGTON, Dec. 9.—Whether it is only a coincidence or has a significant connection, opposition has developed in the Senate to confirmation of the reappointment as a member of the Federal Trade Commission of Commissioner Nelson B. Gaskill, who last Friday filed with the Senate an individual report which made recommendations that would greatly change procedure of the commission. The majority members of the committee declined to permit Mr. Gaskill to incorporate his proposals as a part of the regular annual report, claiming the recommendations had nothing to do with the report. The recommendations themselves, as explained in this issue of THE IRON AGE, dealt with suggestions looking to expediting work of the committee by reducing the number of complaints issued and by having industry agree within itself upon forms of trade practices.

The most remarkable thing about the protest against the reappointment for a term of seven years of Mr. Gaskill, who was given a recess appointment on Sept. 26 by President Coolidge, is the charge that he is an extreme radical. Mr. Gaskill, in the opinion of those following the work of the commission, has been one of the conservative members. Study of his record, however, discloses a remarkably independent and courageous attitude, which, coupled with his keen mind and sincerity, had attracted the admiration of industrial and other circles familiar with his work.

Typical of his service in office and his freedom of action is the attitude Mr. Gaskill took in two steel proceedings. He voted for a complaint against the proposed Bethlehem-Republic-Midvale merger and voted against issuing a complaint in the Pittsburgh base case, and when the order in the latter proceedings was issued, he filed a dissenting report. In both instances he acted respectively under what he considered the authority and lack of authority of the commission. Indicative of the regard in which he is held is the fact that, despite his position in the Pittsburgh base case, Mr. Gaskill's reappointment was strongly urged by the Western Association of Rolled Steel Consumers, which initiated the Pittsburgh base proceedings.

PERSONAL

W. C. Stevenson, who has been resident manager of the Cincinnati office of Hickman, Williams & Co. for the past five years, has been transferred to the Pittsburgh Office to become assistant to the president. Mr. Stevenson has been connected with this company since boyhood and has a large circle of friends among the producers and consumers of pig iron. John H. Tressler, who has been associated with the company for about five years, will succeed to the duties of Mr. Stevenson at the Cincinnati office.



W. C. STEVENSON

Leon Ehrman, formerly assistant superintendent of blast furnaces of the Marting Iron & Steel Co., Ironton, Ohio, has accepted the position of blast furnace superintendent of the Belfont Steel & Wire Co., Ironton, and will have charge of the Belfont and Sarah furnaces. Before going to Ironton, he was with the Cambria Steel Co. at Johnstown, Pa., and previous to that, with the Tennessee Coal, Iron & Railroad Co. at Ensley, Ala.

Thomas M. Reece, formerly with the Motch & Merryweather Machinery Co. in its Pittsburgh sales office and later with the Treadwell Engineering Co., Easton, Pa., has joined the sales force of Manning, Maxwell & Moore, Inc., in its Pittsburgh office.

James Brown, for the past eight years vice-president in charge of manufacturing for Thomas E. Wilson & Co., sporting goods manufacturers, Chicago, has resigned to become president, effective Jan. 1, of the Standard Foundry & Mfg. Co., DeKalb, Ill., manufacturer of furnaces, furnace castings and several types of heavy hardware specialties. Mr. Brown organized and acted as buyer of the sporting goods and cutlery department for Standart Brothers, Detroit, having been associated with that firm for nearly five years. Subsequently he was superintendent of production for the cutlery firm of Miller Brothers, Meriden, Conn. After several years in that position, he went to Chicago, becoming associated with Thomas E. Wilson & Co.

F. B. Keith, formerly with the Youngstown Sheet & Tube Co., has been appointed district sales agent for the Seneca Iron & Steel Co., Buffalo, with offices in the Woolworth Building, New York. W. F. Stahl, formerly in charge of the New York office, will return to the main office at Buffalo, in the capacity of assistant general manager of sales.

V. E. Hillman, director of research at the Crompton & Knowles Loom Works, Worcester, Mass., is scheduled to deliver a paper on the evening of Dec. 19 on "The Evolution of the Blast Furnace and the Manufacture of Pig Iron from Iron Ore" at a joint meeting of the American Society for Steel Treating and the American Chemical Society at the rooms of the Providence Engineering Society, Providence, R. I.

Henry S. Beal, assistant general manager Jones & Lamson Machine Co., Springfield, Vt., plans to leave this country early in January for a visit of eight or ten weeks in Germany and Czech-Slovakia.

Linwood D. Latta, secretary N. Jacobi Hardware Co., Wilmington, N. C., has been appointed secretary-treasurer of the Wayne Agricultural Works, Goldsboro, N. C.

C. J. Thompson has been appointed district sales

manager of the Osgood Co., Marion, Ohio, maker of excavating machinery. He will have charge of the New York district with offices at 50 Church Street, New York.

P. Blair Lee, recently engaged in special work for the vice-president and general manager of Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., has been appointed works manager.

A. L. Abrahams, who has been connected with the Hale & Kilburn Corporation, Philadelphia, and also with the automotive industry, has been made general factory manager of the Kny-Scheerer Corporation, manufacturer of surgical instruments and hospital equipment, New York.

Lawrence W. Wallace, executive secretary of the American Engineering Council, left Dec. 6 for a speaking tour of the South and West. He will address engineering societies, explaining the purpose of the council, stressing especially its aim to establish a national department of public works.

Guy Hubbard, who for the past nine years has been a member of the engineering department at the Windsor, Vt., plant of the National Acme Co., has become associated with the National Bread Wrapping Machine Co. of Nashua, N. H., as assistant to Henri A. Sévigné, general manager.

M. H. O'Hayer has been appointed assistant to the sales manager, E. M. Wightman, of the North & Judd Mfg. Co., New Britain, Conn., maker of hardware and sheet metal specialties. Raymond H. Sullivan, vice-president in charge of manufacturing, will assume the duties of works manager in addition to his other duties.

Grasselli Medal Bestowed on Dr. B. D. Saklatwalla

At the regular meeting of the American section of the Society of Chemical Industry, Friday evening, Dec. 5, at the Chemists' Club, New York, the Grasselli medal was presented to Dr. B. D. Saklatwalla, general superintendent, Vanadium Corporation of America, Bridgeville, Pa. According to the provisions of the donor of the medal, the Grasselli Chemical Co., Cleveland, it may be bestowed during any year upon the author who, in the opinion of the medal committee, has contributed a paper which is outstanding in its practical and scientific value. The medal has been presented but twice before, the first time to Allen Rogers, Pratt Institute, Brooklyn, and to W. H. Fulweiler, chemical engineer, Philadelphia.



DR. B. D. SAKLATWALLA

Francis M. Turner, Jr., technical editor, Chemical Catalog Co., New York, delivered a brief eulogy of Dr. Saklatwalla, outlining his achievements in metallurgy as well as giving some of the history of his education and career. The chairman of the section, Harlan S. Miner, Gloucester, N. J., turned the meeting over to Dr. William H. Nichols, the first American president of the British or parent society, who in well-chosen words presented to Dr. Saklatwalla the medal. This was followed by an able address by the beneficiary on "Fundamentalism in Ferrous Metallurgy."

Dr. Saklatwalla, born in India 43 years ago, is noted particularly for his work on vanadium. His methods for producing ferrovanadium from vanadium ores are regarded as his greatest achievement. His development of special methods for producing stainless iron is his latest contribution to scientific research.

OBITUARY

WILLIAM DETTE, a partner in the firm of Crocker Brothers, dealers in pig iron and ferroalloys, New York, died of an acute heart attack at his home, 565



WILLIAM DETTE

Park Avenue, in that city, on Dec. 3. He was in his fifty-fifth year. Mr. Dette had devoted most of his life to iron and steel interests, having specialized in ferroalloys and charcoal pig iron. His career was begun with Rogers, Brown & Co. in Buffalo, to whose Philadelphia office he later was transferred. After about five years in that capacity, he established a business of his own in Philadelphia. Soon afterward he became associated with Crocker Brothers, with whom he had been identified for 21 years, the last 19 as a partner in the company. Mr. Dette was a member of the Ardsley

and the Lotos Club, New York.

ALEXANDER K. RARIG, founder of the Rarig Engineering Co., now the Ralston Steel Car Co., Columbus, Ohio, died at his home in San Francisco, Nov. 23.

JAMES J. ARMOUR, foundry superintendent of the Studebaker Corporation, South Bend, Ind., died in that city on Dec. 2.

ALBERT J. GLASS, aged 84, for 20 years general manager of the Adriance Platt Co., Poughkeepsie, N. Y., until it was acquired by the Moline Plow Co. in 1913, died at his home in that city on Dec. 1, following a long illness.

EUGENE A. EDDY, owner of the E. A. Eddy Machinery Co., Providence, R. I., dealer in jewelers' machinery for many years, died in Providence on Nov. 24, aged 48 years. At an early age he became connected with the A. B. Pitkin Machinery Co. and subsequently with the Thomas & Lowe Machinery Co. About 25 years ago he established his own business.

W. LUCIEN SCAIFE, chairman of the Scaife Foundry & Machine Co., Pittsburgh, at the time of his retirement from active business about six years ago, died at his home in that city on Dec. 3. He was one of the original trustees of the Carnegie Institute of Technology. He was a member of the board of the Carnegie Hero Fund Commission and a director of the University of Pittsburgh. Mr. Scaife was born in Pittsburgh 71 years ago and was graduated from Yale University with the Class of 1873. He then went to Germany and attended the Freiburg University School of Mines. He was engaged for several years in mining activities in Nova Scotia.

Erratum

On page 1409 of THE IRON AGE for Nov. 27 appeared three cuts covering efficiency curves for three sets of conditions in connection with the operation of oil and gas turbines. At the lower part of each cut are curves for waste-heat recovery and total work for compression. The scales at the left of this lower portion of each cut should have been reversed, reading downward instead of upward. Thus, the first cut should have the three lower figures at the left reading 0 in place of 30, 10 in place of 20 and 20 in place of 10. For the upper right-hand cut the four lower figures should have been 0 in place of 30 and thus downward to 30 in place of 0. For the lower right-hand cut the lowest 20 should be 10, the 10 should be 20 and the 0 at the bottom should be 30.

Silica Brick Prices Advance

PITTSBURGH, Dec. 8.—Leading manufacturers of silica brick today advanced prices \$3 per 1000, the new prices being \$36, f.o.b. works, for Pennsylvania brick and \$45 for those produced in the Chicago district. The advance is directly traceable to the rapid increase in steel works operations in the past three weeks, which caught the steel manufacturers with pretty light stocks of silica brick, the market for which had been so weak for some time as to have encouraged sparing purchases. The result has been something of a scramble for supplies, not only for immediate needs but for winter stocks, and manufacturers have become so well supplied with business that they now can afford to be independent of additional commitments for the next few months. It was frequently claimed that, at recent prices, producers were not getting back a new dollar for an old one and even at the new prices, it is asserted the margin of profit is slim. Other kinds of refractories hold at the prices which have ruled for some time, with business good, in keeping with the conditions in the iron and steel industry which is such a large factor in the demand. Prices are given on page 1581.

British Imports and Exports of Machinery

Department of Commerce reports from the American Consulate-General in London show British imports of machine tools in the first nine months of 1924 at 2523 gross tons, valued at \$416,750, compared with 2791 tons, valued at \$353,579, in the first nine months of 1923. These and other figures for the imports and exports of machinery are covered in the appended tables:

	1924—		1923—	
	Gross Tons	Value	Gross Tons	Value
Machine tools	2,523	\$416,750	2,791	\$353,579
Boilers and equipment	603	76,263	514	55,229
Prime movers	4,278	469,923	2,715	289,289
Textile machinery ...	2,662	634,889	1,902	445,106
<i>Exports of Machinery in Nine Months</i>				
Textile machinery ...	76,769	\$8,011,453	108,669	\$12,539,032
Boilers and equipment	40,604	1,993,273	38,830	1,913,058
Prime movers*	34,888	3,363,477	28,688	3,054,247

*Excluding electrical machinery.

Moderate Increase in Production at Youngstown

YOUNGSTOWN, Dec. 9.—Steel ingot production in the Youngstown district this week equals 85 per cent of capacity, with rolling mill operations on a parity. This represents a moderate increase over the preceding week. The Youngstown Sheet & Tube Co. is operating its plants in this area in excess of 90 per cent, while the Republic Iron & Steel Co. averages between 75 and 80 per cent. Both of these averages represent increased production over recent weeks.

The Newton Steel Co., which has been operating 10 of its sheet mills at Newton Falls in Trumbull County, has enlarged to 14 mills.

The Carnegie Steel Co., Sharon Steel Hoop Co. and Trumbull Steel Co. approximate capacity this week in their production schedules.

For the first time in several years, every independent and corporation bar mill in this district is rolling.

More Locomotives Shipped in November

November shipments of locomotives are given at 123, compared with 96 in October and 104 in September, in a report by the Department of Commerce. Ten were for export and 123 for United States railroads. For 11 months the total has been 1323 units in 1924, compared with 2860 in 1923 and with 3189 in 12 months of 1923. The number of unfilled orders on Dec. 1 was 397, of which 66 were for export. Unfilled orders Nov. 1 were for 462 and on Dec. 1, 1923, for 691. At end of March, last year, a high point was reached, at 2316.

Enjoined from Engaging in Pig Iron Business

In the case of Reed, Fears & Miller, Inc., against John G. Miller, in the District Court of the United States for the Eastern District of Pennsylvania, a decree has been entered by Judge J. W. Thompson, at Philadelphia, ordering that the defendant, John G. Miller, be enjoined from engaging in any way in the business conducted by Miller, Carson & Co., Inc., up to and including May 1, 1925. In the suit brought by Reed, Fears & Miller, Inc., it was alleged that John G. Miller had sold his interest in the company and had agreed not to engage in the business of selling pig iron prior to May 1, 1925, but had violated his agreement by becoming a member of the firm of Miller, Carson & Co., Inc. The court found that the evidence showed that Miller, Carson & Co., Inc., Philadelphia, was engaged in the production and sale of pig iron in the States wherein John G. Miller had agreed not to engage in the pig iron business.

Judge Thompson also ordered that John G. Miller be required to render an accounting to Reed, Fears & Miller, Inc., for all damages sustained by it due to the defendant's acts, as set forth in the bill of complaint. Joseph L. Kun was appointed as special master and directed to hear the evidence and ascertain and report to the court the damages so caused.

Rebuilding Delaware River Blast Furnace

The Delaware River Steel Co. is remodeling its furnace at Chester, Pa., and providing a new dock for unloading. With the building of the dock the slip is being dredged to accommodate boats of the tonnage now available for the movement of imported ore. The dock will be 430 ft. long and 68 ft. wide at its narrowest. On it will be placed a Brown Hoisting Machinery Co. fast plant, the machines being in general construction the same as those now operating on the Port Richmond dock at Philadelphia.

The work on the blast furnace includes the installation of a McKee top, also the provision of bins, scale car and bridge trestles. This contract has been placed with Arthur G. McKee & Co., Cleveland. The furnace is expected to be ready for operation by April 1 and the dock will be completed some time in May. The furnace will then have a capacity of 10,000 tons per month. To meet the increased demand for coke, the coke ovens are being rebuilt. These are owned and operated by the Philadelphia Suburban Gas & Electric Co. Under the existing contract the latter company delivers coke, the furnace company furnishing the coal. The coke company has torn down the Semet-Solvay ovens and is building Roberts-Morris ovens in their place.

Increasing Plant Operations

Iron and metal plants at Kokomo, Ind., are running close to normal, with advances in working forces during the past few weeks. Works now on the active list include the Kokomo Steel & Wire Co., Globe Stove & Range Co., Standard Sanitary Mfg. Co., Hoosier Iron Works, Malleable Iron Works and the Kokomo Brass Works, collectively giving employment to a large number of men on full time schedule. Following a shut-down for a number of weeks, the Haynes Automobile Co. has resumed production under the direction of Robert Tudor, receiver, who has secured permission from the court to work up raw material on hand into finished automobiles to improve the proposed liquidation of assets. The plant will maintain operations for at least two months on a schedule of at least 200 complete cars in this time.

The Murchey Machine & Tool Co., Detroit, is increasing operations and will run on a full basis indefinitely. It is said that the past month has shown an increase of 40 per cent in new business.

The Bethlehem Steel Co. is increasing production at its Lackawanna plant at Buffalo, and is now giving employment to close to 7000 operatives; the largest working force ever engaged at the plant has been 8000 men. Additions are now being made in the quota.

The Messenger Mfg. Co., Detroit, manufacturer of automotive screw products, is running on a full time schedule with a full working force. A night shift has recently been started. The present production basis will be continued for an indefinite period.

Youngstown Fabricators See Good Prospects for Business

YOUNGSTOWN, Dec. 8.—Fabricating interests throughout this district are much encouraged by recent developments affecting their business, and are assured of good business for several months. Jobbers are ordering freely for replenishment and replacement of warehouse stocks. New orders are coming in to the Truscon Steel Co. to such an extent that officials believe production can be maintained at a comparatively high rate through the inventory period.

The Truscon company, which expanded its manufacturing facilities 15 per cent in the Youngstown district this year, is considering further enlargements, and the creation of additional warehouse capacity in the more important consuming territories.

Demand for fireproofing building materials is firm, but there has been a slowing down in the requirements for highway reinforcing materials, due to seasonal conditions.

The General Fireproofing Co. is maintaining an 85 per cent production rate, with its metal filing cabinet department running at capacity. Spring ordering is expected to come forward in volume around the first of the year.

The Youngstown Boiler & Tank Co. is operating close to capacity. The Kalman Steel Co. reports a decline in production from its plant in this city, producing reinforcing steel bars for the Eastern markets.

Oakley Chemical Company's Conference

Bringing together nearly 100 members of the field staff and officials, the eighth annual sales conference of the Oakley Chemical Co. was held in New York on Monday, Tuesday and Wednesday of last week. On Thursday, Dec. 4, the district sales managers had their conference.

The business sessions, which were most enthusiastic, were relieved by theater and dinner parties.

At the annual banquet C. F. Radley presided. The speakers included D. C. Ball, president; Daniel C. Smith, vice-president; J. F. Tonn, sales manager, and F. A. Aston, Detroit district manager of the organization. Mr. Radley, who is director of the company's publications, gave a very interesting account of his trip to Europe with the representatives of the Associated Advertising Clubs of the World. It was illustrated with lantern slides and was cleverly worked into a humorous as well as instructive travelogue.

Favors Sale of Ships

WASHINGTON, Dec. 9.—Chairman O'Connor of the Shipping Board has announced that he will recommend to Congress that the board immediately proceed with the sale of 175 of the 900 vessels of the board's fleet which are tied up. Of this total, he declared, 400 at least are not suitable for use even if they were required and therefore he will urge that they be scrapped for the machinery, steel and other metal that may be salvaged from them.

Production of electric power in the United States in millions of kw. hr. is reported by the Geological Survey for August, September and October at 4735 for August, 4803 for September and 5187 for October. The figures represent a definite advance from the corresponding months of last year, the September total being 6.6 per cent and the October total 3.5 per cent heavier than in 1923. Nearly 70 per cent of the output in each month was from the consumption of fuel, the remainder being from water power.

Machinery Markets and News of the Works

MORE INQUIRIES THAN SALES

Orders for Single Machines Predominate— Outlook Continues Promising

Railroads Inquire for Lathes—Equipment Wanted for Vocational Schools

ALTHOUGH a fair volume of business has been booked during the week, the aggregate of machines inquired for continues to be far in excess of orders placed. Buying has been confined for the most part to single machines. It is probable that action on much of the pending business will be postponed until after the first of the new year.

The Wheeling & Lake Erie Railroad has an inquiry out for four lathes, and the Hocking Valley Railroad is considering the purchase of two lathes. The New York Central is expected to come into the market soon for equipment for its Collinwood shops. A large list is looked for from the Southern Railway for a shop at

Charlotte, N. C. Lists are said to be in preparation by the Illinois Central and the Norfolk & Western railroads.

An inquiry for two lathes and two wood-working machines for a vocational school has been issued by the Board of Education, Newark, N. J., and the Essex County, New Jersey, Board of Education is inquiring for six tools. The Chicago Board of Education has ordered 32 woodworking lathes for the Tilden High School, and has taken bids on 24 engine lathes. None of the 70 tools for the Collinwood High School, Cleveland, has been purchased, and new bids may be asked for on at least part of the list.

A number of machine tools were taken during the past week by the Nash Motors Co., and its subsidiary, the Ajax Motors Co. Orders for about 25 turret lathes are expected to be placed during this week.

The Middletown Car Co. is reported to be about to take action on a list issued some time ago.

Among other prospects is the Goodyear Tire & Rubber Co., Akron, which is expected to buy equipment for its aeronautic division.

New York

NEW YORK, Dec. 9.

WHILE inquiry in this district continues light, there is evidently a general tendency to greater activity. Interest in the purchase of more than a single tool on an order seems to be growing. In addition to the lists of the Lehigh Valley Railroad for a total of eight machines and the New York Central for about six, the Board of Education, Newark, N. J. has issued an inquiry for two small lathes and two wood-working machines for a vocational school and the Essex County Board of Education, N. J., is inquiring for six small tools for a vocational school.

In the past week, a sizable purchase was made by the General Railway Signal Co., Rochester, which closed on a list of \$80,000 to \$90,000 worth of machine tools. Ford & Kimball, Concord, N. H., were also purchasers of the week and came into the market for a car box boring machine. Among the railroads, the Southern Railway was prominent with the purchase of machines including a 90-in. locomotive journal turning lathe, a 36-in. x 16-ft. engine lathe, an 84-in. vertical boring and turning mill and a 36-in. x 36-in. x 10-ft. planer.

The Erie Railroad Co., 50 Church Street, New York, is planning the construction of additional machine shops, engine house and auxiliary buildings at its Briar Hill shops, Youngstown. The work will be carried out in connection with an expansion program in this district, including classification yards near Niles and Girard, additional trackage, equipment, etc., estimated to cost \$2,500,000.

The city government, Rosario, Argentine Republic, is asking bids until April 2, 1925, for a municipal electric light and power plant, and a new electric street railroad system, with equipment.

J. M. Felson, 250 West Fifty-seventh Street, New York, architect, has plans for a four-story automobile service, repair and garage building, 100 x 200 ft., at 509-25 West Thirty-fourth Street, estimated to cost \$250,000, including equipment.

The J. B. Preston Co., 25 Broad Street, New York, roofing products, has inquiries out for a 50 to 75 kw. generator, three-phase, 550 volts, belted type, for use with steam or oil engine.

R. H. Smythe, 681 Fifth Avenue, New York, architect, has completed plans for a two-story automobile service, repair and garage building, 90 x 100 ft., at 203-9 West 154th Street, to cost about \$80,000.

The Swedish Chamber of Commerce in the United States, 2 Broadway, New York, has received an inquiry (197), from a company at Stockholm, Sweden, desiring to get in touch with American manufacturers of foundry supplies.

The Compania Cubana de Electricidad (Cuban Electric Co.), Santa Clara City, Cuba, is planning to rebuild the portion of its machinery building and other structures destroyed by fire Dec. 4, with estimated loss of \$100,000.

The Adirondack Power & Light Corporation, Schenectady, N. Y., has disposed of a bond issue of \$2,000,000, a portion of the proceeds to be used for expansion. Plans are under way for an automatic power substation at Watervliet, N. Y., to cost about \$100,000, with the construction of a steel tower transmission line. Work is in progress on an addition to the steam generating plant on the Mohawk River, Amsterdam, N. Y. J. Ledlie Hees is president.

The United States Cast Iron Pipe & Foundry Co., 71 Broadway, New York, is said to have arranged an appropriation of \$1,500,000 for proposed extensions in its plant at East Burlington, N. J., consisting of a one-story foundry, 120 x 600 ft., to be provided with three traveling cranes; annealing building, and power house.

The Board of Education, Municipal Building, Lyndhurst, N. J., plans the installation of manual training equipment in its proposed two-story high school, estimated to cost \$350,000, for which a general contract has been let to C. E. Bowman, 41 Prospect Street, Ridgewood, N. J. R. E. Backer, Palisade, N. J., is architect.

The Sandow Tool Co., Rochelle Park, N. J., has plans for a one-story addition to its machine shop, 50 x 100 ft., to cost \$30,000. Gretsche & Brenner, Bible House, New York, are architects.

The Horn Signal Mfg. Corporation, Newark, N. J., care of Isador Stern, 20 Branford Place, registered agent, has leased the building at 153-55 Frelinghuysen Avenue, for a new plant to manufacture traffic signal lamps and other electric signal devices. The company was chartered recently with a capital of \$500,000 by Paul P. Horn and Charles Milbauer. The last noted has been elected president.

The Newark Sheet Metal & Kalamein Co., Newark, care of E. C. Epple, Union Building, architect, will erect a one-story plant, 40 x 200 ft., on Grove Street, Irvington district, for which bids are being received on a general contract.

The Fagan Iron Works, Fourteenth Street, Jersey City, is said to have plans for rebuilding its pattern shop, recently destroyed by fire with loss of about \$40,000.

The Wickes Machinery Co., Jersey City, N. J., is in the market for a 100-kw., 220 volt, three-phase, 60 cycle generator set, driven by a four-valve engine.

Chicago

CHICAGO, Dec. 8.

MACHINE-TOOL buying is steadily gathering momentum, although prospective business greatly exceeds actual orders. Purchases by the Nash Motors Co. and its subsidiary, the Ajax Motors Co., still occupy the center of the stage. During the past week, orders have been placed for cylindrical grinders, heavy duty drilling machines for cylinder reaming, sensitive drills, milling machines, and five turret lathes. This week orders will be placed for additional turret lathes as well as presses. That will complete the major part of the program of the Nash interests, outside of individual machines which will be bought to fill in gaps in the present line-up of production equipment.

The Chicago Board of Education has ordered 32 wood-working lathes, involving a total of \$10,000, for the Tilden high school. It has also taken bids on 12 14-in. x 5-ft. engine lathes and 12 14-in. x 6-ft. lathes. The lowest tender was on South Bend lathes and the next in order were on Monarch, Rockford and Sidney lathes. The Wabash Railway has placed orders for \$25,000 worth of equipment, including three engine lathes for a machine shop, two punches, a bar shear, and three lathes for a boiler shop, as well as several other miscellaneous items. The Sioux City Terminal Railway has closed for \$15,000 to \$18,000 worth of tools. The large lists expected from Western roads terminating in Chicago will probably not be issued until after Jan. 1. Business from industrial sources is reviving. The P. B. Yates Machine Co., Beloit, Wis., has placed orders for two turret lathes, eight milling machines, a hack saw, and two thread-milling machines. The American Steel & Wire Co., Chicago, is in the market for a turret lathe for Joliet and later expects to inquire for a turret lathe for its Waukegan plant.

Fenske Brothers, manufacturers of furniture, Chicago, are taking bids through C. W. Lampe & Co., 155 North Clark Street, on a five-story addition, 50 x 115 ft., at McHenry and Rawson Streets, to cost \$60,000.

The Clearing Industrial District has closed a long term lease with the Bersted Mfg. Co., manufacturer of electrical household appliances, now located at 771 Mather Street, Chicago, for 65,000 sq. ft. of ground at the corner of Laramie Avenue and Sixty-fifth Street, improved with a one-story monitor type plant containing 35,000 sq. ft.

The Charter Gas Engine Co., Sterling, Ill., has plans for a one-story machine shop, 75 x 180 ft., to cost \$50,000. Frank D. Chase, Inc., 645 North Michigan Avenue, Chicago, is architect and engineer.

The Northwestern Public Service Co., Yankton, S. D., is considering plans for extensions in its local power plant to cost about \$100,000 with equipment. It is purposed to begin work in 60 to 90 days. E. T. Hughes is local manager.

The Illinois Central Railroad Co., 135 East Eleventh Place, Chicago, has plans for additional machine and repair shops and 48-stall roundhouse at its Markham yards. F. L. Thompson is chief engineer. F. R. Judd is engineer of buildings.

The C. H. Carlson Mfg. Co., 720 Fourth Street, Minneapolis, Minn., manufacturer of machinery and parts, has awarded a general contract to the James H. Brown Co., 621 South Third Street, for a one-story addition, 44 x 100 ft.

The Western Public Service Co., Scottsbluff, Neb., will build an ice-manufacturing and refrigerating plant at Bayard, Neb., to cost about \$50,000 with machinery. An automatic refrigerating machine of 2-ton capacity will be installed.

The Board of Education, Des Moines, Iowa, plans the installation of manual training equipment in its proposed Warren Harding junior high school, estimated to cost \$500,000, for which bids are being asked on a general contract until Dec. 16. Boyd & Moore, Insurance Exchange Building, are architects.

The Blanchard Rapids Power Co., Little Falls, Minn., will rebuild the portion of its hydroelectric power plant and power dam, recently destroyed by fire with loss of \$50,000. Ray C. Miller is engineer.

St. Louis

St. Louis, Dec. 8.

THE Wabash Railway Co., St. Louis, recently purchased 12 machine tools for its shops at Decatur, Ill., and Fort Wayne, Ind., the list being closed less than a week after it was issued. The purchases follow:

- Three engine lathes, 18 in., 20 in. and 24 in. respectively.
- One Morton draw-cut shaper.
- One Chambersburg 100-ton bushing press.
- One Niles 6-ft. radial drill.
- One Bardons & Oliver screw machine.
- One bar shear.
- One No. 4 milling machine.
- One 8-in. centering machine.
- Two hack-saw machines.

The Missouri Pacific Railway bought one Greenlee radial car boring machine and one Greenlee mortiser.

The Kansas City Southern Railway, Kansas City, Mo., purchased the following tools on its list recently issued:

- One Putnam driving and turning lathe.
- One National 3-in. forging machine.
- One Columbia 32-in. shaper.
- One Chambersburg 5000-lb. hammer.
- One Chambersburg 100-ton bushing press.
- One Dreses radial drill.

Bids will be taken at once by the Peoples' Motor Bus Co., 535 Adelaide Avenue, University City, Mo., for a one and two-story service, repair and garage building, 125 x 150 ft., on Delmar Boulevard, near Rosedale Street, St. Louis, to cost about \$150,000 with equipment. Mauran, Russell & Crowell, Chemical Building, St. Louis, are architects. R. W. Meade is president.

The Walte-Phillips Oil Co., Wichita, Kan., will begin the construction of a one-story pumping plant to cost \$30,000 with equipment.

The Chandeysson Electric Co., 4092 Bingham Avenue, St. Louis, manufacturer of electric equipment and supplies, has plans for a new two-story factory, 50 x 230 ft., to cost \$100,000 including equipment. The Widmer Engineering Co., Laclede Gas Light Building, is engineer.

The Johnson & Son Machinery Co., 1001 North Sixth Street, St. Louis, has awarded contract to the Walter C. Harting Construction Co., International Life Building, for a one-story and part basement building to cost about \$25,000. W. C. Johnson is president.

W. D. Beard and Clement DeNoya, Pawhuska, Okla., will begin the construction of a one-story ice-manufacturing plant, 70 x 100 ft., estimated to cost \$75,000 with equipment.

The Board of Managers, State Eleemosynary Institutions, Jefferson City, Mo., is considering the construction of a one-story power plant for the State Hospital for Insane, and Deaf and Dumb School, Fulton, Mo., estimated to cost \$150,000 including machinery.

The Common Council, Wetumka, Okla., is having plans drawn for a municipal waterworks, and will ask bids in the near future for pumping machinery and accessories, with filtration apparatus, estimated to cost \$53,000, also for electric power plant extensions and improvements to cost about \$40,000. V. V. Long & Co., Colcord Building, Oklahoma City, Okla., are engineers.

The Pierce Oil Corporation, Bank of Commerce Building, St. Louis, will build an addition to the steam power plant at its oil refinery at Sand Springs, Okla., in connection with enlargements in the refinery now in progress. Considerable additional equipment will be installed. J. J. Allinson is general manager.

The Common Council, Madill, Okla., has preliminary plans for a one-story electric light and power house to cost about \$50,000 including equipment. K. B. Carson, Madill, is engineer.

The Long-Bell Lumber Co., Long and Bannister Streets, Kansas City, Mo., is disposing of a common stock issue to total \$7,912,500, a portion of the proceeds to be used for expansion. It recently established a plant at Longview, Wash., and plans the early erection of additions to this mill. A new corporation has been formed under Maryland laws to be known as the Long-Bell Lumber Corporation to take over the existing organization. R. A. Long is chairman of the board of directors.

The Crane Market

WHILE inquiries for both overhead and locomotive cranes continue in fair volume, purchases in the overhead field are still rather light. A number of awards of locomotive cranes, however, are noted in the past week. The recent inquiry of the Faltoute Iron & Steel Co., 182 Frelinghuysen Avenue, Newark, is for a 15-ton overhead crane, preferably used. Part of the list of cranes recently issued by the General Electric Co., Schenectady, N. Y., for West Philadelphia and Detroit plants is understood to include alternates, so that the entire 14 overhead cranes originally requested probably will not be purchased. Specifications on the crane to be purchased by the Phoenix Utility Co., 71 Broadway, New York, have been issued and call for a 120-ton overhead crane of slightly special design. The Phoenix Utility Co. is reported to have recently closed on a 50-ton stationary hoist. New specifications on the two 20-ton hand power cranes, which it is understood are to be bought by the Public Service Production Co., Newark, for the Bath-Portland Cement Co., Sands Eddy, Pa., have not yet come out. A dealer in second-hand equipment is asking for a 5 to 7-ton 60-ft. span used crane. The George Halss Mfg. Co., 142nd Street and Canal Place, New York, is in the market for a 10-ton, 46-ft. 6½-in. span electric traveling crane, new or used. The Christiana Machine Co., Christiana, Pa., is inquiring for a used 5-ton, 46-ft. span, floor-control electric crane for its foundry.

In the Pittsburgh district it is reported that the appropriation for cranes to be installed at the McDonald mill of the Carnegie Steel Co. has not yet been granted. Five

cranes are among the early 1925 possibilities at the Gary mills of the National Tube Co.

Among recent purchases are:

Public Service Production Co., Newark, N. J., a 15-ton, gasoline driven, crawl tread locomotive crane from the Link-Belt Co.

Cullen Fuel Co., 412 East Thirtieth Street, New York, a 25-ton locomotive crane with 10-ft. gage, from the McMyler-Interstate Co.

William M. Ballard, Inc., Syracuse, N. Y., a 50-ton, 60-ft. boom locomotive crane from the Industrial Works.

Lynn Gas & Electric Co., Lynn, Mass., a 12½-ton crane with 32½-ft. boom, understood to have been purchased from the McMyler-Interstate Co.

Elgin, Joliet & Eastern Railway, Chicago, a locomotive crane from a northwestern builder.

Lucas Machine Co., Cleveland, a 10-ton, 45-ft. span electric traveling crane from an eastern builder.

Municipal Marine Terminal, City of Wilmington, Del., a 25-ton locomotive crane from the Industrial Works.

Mystic Iron Works, Boston, a 30-ton and a 10-ton electric traveling cranes for a plant at Everett, Mass., from the Shaw Electric Crane Co.

Southern Railway, Washington, three small capacity cranes for the new yards at Knoxville, Tenn., reported purchased from a midwestern builder.

New England

BOSTON, Dec. 8.

THE local machine-tool market remains dull and uninteresting. The only important sale reported the past week was a new car box boring machine to a New Hampshire railroad shop. Inquiries have fallen off, but machinery dealers are busy on old ones, mostly for single and more or less special equipment. No improvement in business is expected until after the first of the new year. Notwithstanding the lack of business, the market appears in a healthy condition. Manufacturers of metal-working equipment are holding strongly to list prices, and used tool dealers' ideas on prices are strengthening. The supply of really good used equipment in New England is comparatively small.

The city of Boston contemplates the erection of a boys' trade school in Roxbury, Sherwin district. McLaughlin & Burr, 78 Tremont Street, Boston, are the architects.

The Worthington Pump & Machinery Corporation, 265 Third Street, Cambridge, Mass., will erect a foundry, 81 x 166 ft. Thomas Mulcare, 414 Mt. Auburn Street, Cambridge, has the contract.

Bids close Dec. 13 on a two-story, 144 x 195 ft. power station contemplated by the United Illuminating Co., Broad Street, Bridgeport, Conn. Westcott & Mapes, 139 Orange Street, New Haven, Conn., are the architects.

Work will shortly begin on a one-story, 300 x 1160 ft. assembly plant unit at East Somerville, Mass., to cost \$4,000,000 with equipment, for the Ford Motor Co. The unit will have a 500 car per day capacity and employ 2500 men. The property consists of thirty acres along the Mystic River and the Boston & Maine Railroad. It will have a railroad siding capacity of 200 cars. The first unit probably will be in operation before the close of 1925 and a second unit will be started next year.

The Frank H. Davis Co., 175 Richdale Avenue, Cambridge, Mass., is in the market for a screw cutting engine lathe, 15 ft. between centers and 48 in. swing over carriage.

The Morgan Construction Co., Crescent Street, Worcester, Mass., manufacturer of rolling mill machinery, has filed plans for a one-story addition, to cost \$72,000, for which a general contract recently was let to the E. J. Cross Co., Worcester.

The Autoyre Co., Oakville, Conn., manufacturer of wire goods, metal stampings, etc., has awarded a general contract to the Tracy Brothers Co., Waterbury, Conn., for a four-story addition, 60 x 180 ft. It is said that other buildings will be erected later. Fletcher-Thompson, Inc., Bridgeport, Conn., is architect.

The Greb Co., Inc., 173 State Street, Boston, manufacturer of automotive equipment, has work under way on a new machine shop at Stoughton, Mass. The J. L. Roberts Engineering Co., 101 Tremont Street, Boston, is engineer.

The Emerson & Stevens Co., Oakland, Me., manufacturer of axes, scythes, etc., has construction in progress on a new building to replace a shop destroyed by fire several months ago.

The E. Van Noorden Co., 100 Magazine Street, Roxbury, Boston, manufacturer of sheet metal products, is said to be planning the early purchase of additional machinery for expansion.

Cincinnati

CINCINNATI, Dec. 8.

COMPARED with September and October, the month of November was dull for machine-tool manufacturers, some reporting a decrease of 50 per cent in business booked. However, more activity was noted in the first week of December, and with the large volume of inquiry it is expected that improvement will continue. While most of the orders placed during the past week were for single machines, some ran up into fairly large totals. Demand from automobile manufacturers is not heavy, but is expected to develop within the next few weeks. Dealers in used machinery report an improvement in sales of small tools.

A local manufacturer closed on four large machines from England, and an order for a number of tools was received from an unidentified source in South America. The Central Tube Co., Economy, Pa., is buying from time to time, and the Middletown Car Co. is about to take action on a list issued some weeks ago. Railroad buying is expected to develop the first few months of the year, and lists are now said to be in preparation by the Illinois Central and the Norfolk & Western for new shops now being built. The Southern Railway, which has been a fairly consistent buyer for the past few months, is expected to issue a large list for a shop at Charlotte, N. C.

The Union Gas & Electric Co., Cincinnati, is preparing plans for extensions and improvements at its Hamilton, Ohio, plant, to cost approximately \$100,000.

The city of Hamilton, Ohio, is contemplating improvements to the waterworks system to cost approximately \$65,000. New pumping equipment will be installed.

The Champion Coated Paper Co., Hamilton, Ohio, has plans for a one-story addition to cost about \$55,000. R. O. Mueller and W. R. Hare, Rentschler Building, are associated architects. T. O. Thomson is president.

The Signal Mountain Portland Cement Co., James Building, Chattanooga, Tenn., has approved an appropriation of \$300,000 for the construction of a new unit to be equipped for a daily capacity of 1500 bbl. of cement, bringing the total daily output to 4500 bbl. J. L. Senior is president, and J. P. Hoskins, secretary and treasurer.

The United States Cast Iron Pipe & Foundry Co., Boyce and Twenty-seventh Streets, Chattanooga, Tenn., is planning for a one-story foundry addition to cost \$17,000.

The Crane Enamelware Co., Fourteenth and Chestnut Streets, Chattanooga, Tenn., a subsidiary of the Crane Co., Chicago, has completed plans for a one-story addition, 190 x 200 ft.

Fire, Dec. 1, destroyed a portion of the shops of the Southern Railway Co., Knoxville, Tenn., with loss of \$350,000 including equipment. Rebuilding plans are said to be under consideration.

The Bostwick-Goodell Co., Norwalk, Ohio, manufacturer of sash, doors, etc., has preliminary plans for the erection of a new three-unit plan, to cost close to \$100,000 with machinery.

The Gougler Machine Co., Kent, Ohio, Charles L. Gougler, president, is considering the construction of a one-story machine shop for which plans will be drawn by C. G. Kistler, Kent National Bank Building, architect.

Buffalo

BUFFALO, Dec. 8.

JOHN REINHEIMER, 301 East Genesee Street, Buffalo, has plans for a one-story metal-working and nickel-plating plant, 160 x 200 ft., and will ask bids early in the coming year. James J. Geigand, 340 Sherman Street, is architect.

The Star Paving Co., 60 Roma Avenue, Buffalo, has acquired property at Clarence and Clyde Avenues, 90 x 200 ft., for the erection of a new plant to manufacture concrete blocks and other cast cement products.

The Board of Education, Telephone Building, Buffalo, is said to be planning the early purchase of a 12-in. screw-cutting lathe, drill press and other tools.

The American Laundry Machinery Co., Ross Avenue, Norwood, Cincinnati, has awarded a general contract to the Ferro Concrete Construction Co., Cincinnati, for a three-story addition to its plant at Rochester, 60 x 240 ft., to cost \$300,000 with equipment. It will replace the portion of the works recently destroyed by fire. John J. Strohle, Rochester, is architect.

Branch Brothers, 83 Clyde Avenue, Buffalo, manufacturers of metal products, are said to be planning the purchase of machinery for installation in their plant.

William F. Schwartz, Commissioner of Public Works, Municipal Building, Buffalo, will take bids until Dec. 22 for furnishing one direct connected motor-driven centrifugal pump and one horizontal motor-driven pump, together with necessary steel frame work, etc.

The Fancher Furniture Mfg. Co., Salamanca, N. Y., is having plans prepared for a four-story addition, 65 x 141 ft., to cost \$100,000 including equipment. John Walrath is general manager.

Indiana

INDIANAPOLIS, Dec. 8.

DUNLAP & CO., Fifth and Jackson Streets, Columbus, Ind., operating a lumber and contracting business, have plans for a two-story machine shop, 60 x 150 ft., to cost about \$45,000 with equipment. It will replace a structure recently destroyed by fire.

The Circle A Products Co., Champaign, Ill., manufacturer of portable houses, has awarded a general contract without competition to the Bowyer Construction Co., Newcastle, Ind., for a branch plant at Newcastle, consisting of a main mill, 120 x 500 ft., with power house, to cost approximately \$200,000 including machinery. F. B. Berger and R. L. Kelly, Champaign, are associated architects.

The Alfred Mfg. Co., Indianapolis, recently organized, will operate a plant at 118 South Harding Street for the manufacture of sheet metal products.

The Martin-Parry Corporation, Indianapolis, manufacturer of commercial automobile bodies, contemplates extensions in its two local plants. The initial expansion will take place at the west side plant at Henry Street and Holly Avenue to provide for an increase from 19 to 25 carloads of bodies per day, with installation of additional equipment. Later work will comprise an enlargement in the works on Roosevelt Avenue. Headquarters are at York, Pa.

The Indianapolis Power Hammer Works, Indianapolis, have arranged for the operation of a new plant in the Mars Hill section.

The Sinclair Oil Co., East Chicago, Ind., is said to have plans under advisement for extensions in its local refinery, with the installation of additional equipment. Work will start early in the spring.

Philadelphia

PHILADELPHIA, Dec. 8.

THE Lehigh & New England Terminal Warehouse Co., Philadelphia, will proceed with the erection of a seven-story refrigerating and cold storage plant in the Rosemont section, Bethlehem, Pa., to cost more than \$800,000 with machinery.

The H. Brinton Co., Kensington and M Streets, Philadelphia, manufacturer of knitting mill machinery, has awarded a general contract to the William Steele & Sons Co., 219 North Broad Street, for a one-story addition.

The Acme Brass Foundry, 8016 Pine Road, Fox Chase, Philadelphia, has taken out a permit for a one-story foundry at American and Bristol Streets.

The Philadelphia & Reading Railroad Co., Reading Terminal, Philadelphia, will proceed with the construction of additional sections at its new coal-loading plant at the Rutherford, Pa., yards, to include the installation of coal crushing machinery, loading equipment, water towers, etc., with capacity of about 150 locomotives per day. It will also install material-handling and conveying equipment at its proposed freight station at Lebanon, Pa., for which plans have been drawn, to cost approximately \$200,000.

The Foreign Trade Bureau, Philadelphia Commercial Museum, has received an inquiry (42971) from the Hip Tung Wo Co., Canton, China, in the market for a hydraulic plant for pressing oil from ground nuts, with accessories, price c.i.f. Canton; an inquiry (42938), from Nicholas Audivert, for J. L. Cariaga, Yunguyo, Peru, desiring information regarding American cement mill machinery for installation at a proposed plant in the vicinity of La Paz; and an inquiry (42955) from Balboa Edwards & Co., 91 St. Louis Street, Castries, St. Lucia, West Indies, desiring to get in touch with American manufacturers of wire nails.

The Philadelphia Paper Mfg. Co., Nixon Street, Philadelphia, manufacturer of boxboard, etc., has filed plans for an addition to its machine department in connection with other extensions to cost about \$75,000, for which a general contract has been let to the Hughes-Foulkrod Co., Commonwealth Building.

The Board of Education, School District of Cheltenham Township, Charles Bond, president, care of the Charles Bond Co., 617 Arch Street, Philadelphia, is taking bids until Dec. 23 for a three-story high school at Elkins, Pa., estimated to cost \$500,000, in which it is proposed to install a manual training department. Davis, Dunlap & Barney, 1805 Walnut Street, Philadelphia, are architects.

Motors, power equipment, conveying and other machinery will be installed in the four-story printing plant to be erected by the *Scranton Times*, Scranton, Pa., estimated to cost \$475,000, for which a general contract has been let to Dwight P. Robinson & Co., Inc., 125 East Forty-sixth Street, New York. The contractor will also act as engineer for the structure.

Lester Davis, 616 Spruce Street, Scranton, Pa., architect, has plans for a three-story automobile service, repair and garage building, 120 x 160 ft., estimated to cost \$250,000 with equipment. It is expected to ask bids early next year.

The General Die Casting Co., Pottstown, Pa., has awarded a general contract to H. E. Baton, Inc., 1713 Sansom Street, Philadelphia, for a one-story plant on Ninth Street, near Pike Street, Reading, Pa., 60 x 150 ft., for which foundations will be laid at once. F. C. Morrison is vice-president.

The Board of Education, Greensburg, Pa., plans the installation of manual training equipment in its proposed four-story and basement high school, estimated to cost \$550,000, for which plans are being drawn by Maurice E. Kressley, Commonwealth Building, Harrisburg, Pa., architect.

In connection with its proposed expansion, the Parish Mfg. Co., Chestnut Street, Reading, Pa., manufacturer of steel automobile frames, axles, etc., has taken out a permit to erect a new plant building on Wesser Street, estimated to cost \$150,000.

The E. B. Leaf Co., Real Estate Trust Building, Philadelphia, is in the market for fine clean cast iron borings.

The Miller Lock Co., Philadelphia, is planning to purchase a New Britain chucking machine.

The Ford Service Garage, Meadville, Pa., has acquired property at Water and Terrace Streets, upon which it will erect a three-story garage and service station to cost \$50,000. Machinery requirements will include a motor-driven cylinder re boring machine, lathe, drill press, air compressor and small portable tools. D. G. Eddy heads the company.

Milwaukee

MILWAUKEE, Dec. 8.

VISIBLE evidence of improving business is noted. A number of local industries which are large users of machinery and tools have announced plans for extensions contemplated for some time past, but not released until the general situation appeared more stable. Machine-tool builders are beginning to feel the effect of the better sentiment, although their operations as yet have made no substantial gain.

The Milwaukee Corrugating Co., Milwaukee, manufacturer of sheet steel products, principally metal building materials, will invest about \$250,000 in the enlargement of the main plant at Thirty-sixth Avenue and Burnham Street. Contracts were let Dec. 5 for a two-story brick and steel manufacturing addition, 200 x 210 ft. The project is in charge of Klug & Smith, designing and contracting engineers, 67-69 Wisconsin Street. Louis Kuehn is president and treasurer Milwaukee Corrugating Co.

The Maynard Electric Steel Casting Co., Milwaukee, will erect an addition costing about \$75,000 with equipment. Gurda & Gurda, architects, 448 Mitchell Street, are completing plans for a two-story brick and steel building, L-shaped, 77 x 101 and 67 x 72 ft., and will take construction bids after Dec. 10. The major area will be used as a pattern shop. The foundry is at Kilbourn Road and the Chicago & North Western tracks. Frank W. Wabiszewski is general manager.

The Milwaukee Laundry Washer Co., organized recently by George J. Woboril and Oliver L. Longley, has leased a factory on Milwaukee Street, Oconomowoc, Wis., and is preparing to manufacture commercial and domestic laundry equipment, tools and machinery. A few more items of production equipment remain to be purchased.

The Hannahs Mfg. Co., 528 Grand Avenue, Kenosha, Wis., manufacturer of tables and other fine furniture, will build a two-story addition, 60 x 200 ft., which with wood and metal-working machinery will cost about \$100,000. The list is not yet available. The general contract for the building has been let to Madsen & Peterson, Inc., 646 Builders Exchange, Minneapolis. Fred C. Hannahs is president and general manager of the Kenosha concern.

The Hoppe Motor Car Co., 178-180 Seventh Street, Milwaukee, has plans by A. T. Seldenschwartz, architect, 290 Third Street, for a \$50,000 automotive sales and service building, 60 x 155 ft., two stories and basement, to be erected at once on Grand Avenue, near Thirty-sixth Street. Bids will be opened Dec. 16. New tools, machinery, fixtures and other equipment will be required. A. Carl Hoppe is president and general manager.

The Boehck-Lowe Machinery Co., 71 West Water Street, Milwaukee, dealer in and repairer of machine tools and other machinery, and now completing a new office, warehouse and machine shop building at 2404 Clybourn Street, has changed its corporate title to Boehck Machinery Co. Richard E. Boehck, president and treasurer, acquired the Lowe interests some time ago. Designing and production of special mechanical appliances will be a feature of the business in the new plant.

The Line Material Co., South Milwaukee, is in the market for a double geared punch press, 42 to 48 in. between up-rights, with a 4 to 5-in. stroke and a 5-in. shaft diameter, or larger.

Detroit

DETROIT, Dec. 8.

ABOUT 36 acres at River Rouge, Mich., has been acquired by the J. W. Murray Mfg. Co., General Motors Building, Detroit, manufacturer of sheet steel automotive products, which is said to be planning the erection of a new metal stamping works on a portion of the site. J. R. Murray is president.

The Flint Malleable Casting Co., Dayton Building, Flint, Mich., will soon ask bids on a general contract for a one-story foundry on the Bristol Road, 140 x 379 ft., for which plans are being completed by Wright & Nice, Flint Coal Co. Building, architects and engineers. J. Barringer is general manager.

The Regent Stove Co., Wyandotte, Mich., is completing plans for a one-story addition, 60 x 300 ft., estimated to cost \$35,000.

The Blackmer Rotary Pump Co., Petoskey, Mich., plans the construction of a one-story foundry and power house at its new plant at Grand Rapids, Mich. Contract was let recently for the initial building, 100 x 345 ft., which will be used primarily as a machine shop and assembling works.

The Barnes Wire Fence Co., 1930 Ferry Park, Detroit, has awarded a general contract to the H. K. Ferguson Co., Cleveland, for a one-story building, 60 x 165 ft.

The Common Council, Hart, Mich., is planning the construction of a municipal electric light and power plant to cost \$62,000. It is proposed to issue bonds in amount noted.

Fire, Nov. 27, destroyed a portion of the plant of the Chapman Portable House Co., St. Johns, Mich., with loss estimated at \$65,000 including equipment. It is planned to rebuild.

The Mac Sim Bar Paper Co., Otsego, Mich., is said to be contemplating additions in its plant during the coming year to cost about \$500,000 with machinery. It recently awarded contract for a one and two-story extension to cost \$85,000. Billingham & Cobb, Press Building, Kalamazoo, Mich., are engineers.

Smith, Hinchman & Grylls, Marquette Building, Detroit, architects and engineers, have plans for a four-story and basement automobile service, repair and garage building, 100 x 200 ft., at Randolph Street and Adams Avenue, to cost \$150,000.

The Detroit Edison Co., 2000 Second Street, Detroit, will issue bonds for \$12,500,000, the proceeds to be used for extensions in electric generating plants and systems.

The Common Council, Reed City, Mich., is planning for extensions in the municipal power house and the installation of a 200 hp. oil-burning engine and accessory equipment.

The Standard Oilgas Heating Co., 405 North Washington Avenue, Lansing, Mich., recently organized, is in the market for pressure tank equipment, specially designed stoves, also hand pumps and air compressors. M. J. Somers is president.

Cleveland

CLEVELAND, Dec. 8.

THERE was a fair volume of sales in single machines the past week. While no sizable lists came out, a good amount of business is in prospect and the outlook is more promising than for several weeks. However, it is expected that considerable pending business will not be placed until after the first of the year. Many plants in the metal-working field are contemplating extensions which should stimulate the demand for equipment.

The National Carbon Co. is still buying tools and during the week purchased a 14-in. lathe and a 20-in. shaper. The railroads are showing more activity. The Wheeling & Lake Erie has an inquiry out for four lathes and the N. Y. Central is inquiring for a shaper and is expected to come into the market shortly for other tools for its Collinwood shops. The Hocking Valley Railroad is considering the purchase of a 24-in. and 30-in. lathes. The Goodyear Tire & Rubber Co., Akron, is expected to buy equipment shortly for its aeronautic division. In the automobile field, the Nash Motors Co. has an inquiry out for 25 hand turret lathes which are expected to be placed this week. None of the 70 tools on the Collinwood high school list has yet been purchased and there is a probability that new bids will be asked for on at least a part of the lists. The American Hard Rubber Co., Akron, Ohio, has closed with an Eastern maker on 16 large gear reduction units.

The Ridge Cast Products Co., Mineral Ridge, Ohio, has awarded a contract to the Warren Engineering Co., Warren, Ohio, for a one-story and basement foundry and machine shop, 60 x 400. It is in the market for conveying equipment.

The Herbrand Co., Fremont, Ohio, which has plant additions under way, will take bids shortly for a power house, 60 x 160 ft.

The Cement Products & Supply Co., 247 Northern Boulevard, Toledo, Ohio, will erect a one-story plant, 60 x 100 ft.

The Central Brass & Mfg. Co., East Fifty-fifth Street and Bragg Avenue, Cleveland, manufacturer of plumbers' brass goods, has taken bids for a three-story and basement building, 63 x 122 ft. which will be used for a machine shop, assembly room, plating and buffing departments and boiler room. Christian Schwarzenberg & Gaede are the structural engineers.

The Industrial Steel Castings Co., Waterworks Drive, Toledo, Ohio, has taken bids for a one and part two-story factory building. J. L. Tillman is president and W. E. Wine, secretary. Mills-Rhines-Bellman & Nordoff, Ohio Building, Toledo, are the architects.

The Aetna Foundry & Machine Co., Warren, Ohio, is placing contracts for a one-story machine shop, 110 x 190

ft. The structural steel has been placed with the Blaw-Knox Co., Pittsburgh.

The France Mfg. Co., 1036 Berea Road, Cleveland, manufacturer of electrical supplies, will erect a two-story and basement factory, 58 x 93 ft. P. K. Ranney is secretary and treasurer.

The Claus Cutlery Co., Fremont, Ohio, is in the market for equipment for a one-story forge shop, 43 x 82 ft., for which a general contract has been awarded.

The Linzer Electric Motor Co., Mansfield, Ohio, recently incorporated with a capital of \$75,000, plans establishment of a factory for the manufacture of electric motors and equipment. Albert G. Linzer and Harry S. Black head the company.

The Commercial Shearing & Stamping Co., Box 309, Youngstown, is inquiring for a large toggle drawing press equivalent to Toledo 168½. Tie rod construction is required.

South Atlantic States

BALTIMORE, Dec. 8.

THE Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Dec. 23 for 18 oxy-acetylene welding torches for the Norfolk Navy Yard, schedule 3012; also 1730 steam and water valves, 2200 steam and water unions, and 300 steam and water elbows for the same yard; and a quantity of steam and water nipples for the Mare Island Yard, schedule 3005.

S. B. McCall, Reidsville, Ga., is in the market for 30 and 50-hp. engines, 100-hp. boilers, and accessory equipment.

The Commissioners of Public Works, Elloree, S. C., E. F. Irick, chairman, will receive bids until Dec. 17 for equipment for a municipal waterworks, including pumping machinery, 75,000-gal. steel tank mounted on 100-ft. tower, and auxiliary apparatus. The Ryan Engineering Co., Arcade Building, Columbus, S. C., is engineer.

The Parker Metal Decorating Co., Howard and Ostend Streets, Baltimore, has awarded a general contract to the J. A. Clark Construction Co., American Building, for a one-story addition. Edwin A. Parker is president.

The United States Engineer, Savannah, Ga., will receive bids until Dec. 23 for hoisting and hauling gear, without engine, as per specifications, circular 137.

The Atlantic Ice & Coal Corporation, Washington Street Viaduct, Atlanta, Ga., has awarded a general contract to the Foundation Co., 120 Liberty Street, New York, for its proposed ice-manufacturing and refrigerating plant on Macon Road, Fort Valley, Ga. It will have an initial capacity of 150 tons of ice per day. Contract for engines has been given to the McIntosh & Seymour Corporation, Auburn, N. Y.

The Columbus Electric & Power Co., Columbus, Ga., is disposing of a bond issue of \$2,000,000, the proceeds to be used in connection with a hydroelectric power development at Bartlett's Ferry, on which initial work has started. It will be equipped for a capacity of 40,000 hp. A transmission system will be built.

The D. W. Roof Lumber Co., Columbia, S. C., will begin the erection of a one-story woodworking mill, 75 x 125 ft., to cost about \$35,000 with machinery, of which a list will soon be arranged.

J. H. Privott, A. C. Langley, Berkley Station, Norfolk, Va., and associates are completing plans for a one-story ice-manufacturing plant estimated to cost \$65,000.

The Farmers' Gin Co., Kite, Ga., is in the market for a 30-hp. steam engine and accessories.

The Southern Iron & Equipment Co., Grant Building, Atlanta, Ga., has inquiries out for twenty locomotive air pumps, 9½ in., standard type, new or rebuilt.

The Dixie Furniture Co., Lexington, N. C., has begun the erection of a three-story addition, 35 x 125 ft., the entire structure to be equipped for manufacture.

The Chief of Air Service, United States Army, Washington, will take bids until Dec. 22 for gravity tanks, tank assemblies, radiator shutter assemblies and kindred equipment, proposal 2553.

Kingan & Co., 33 Alabama Street, Atlanta, Ga., have preliminary plans under advisement for a new cold storage and refrigerating plant estimated to cost \$100,000 with machinery.

The A. W. Chase Co., 101 Marietta Street, Atlanta, Ga., is planning the purchase of a cotton baling press.

The Board of Education, District of Columbia, Washington, has plans under way for a two-story and basement school, 300 x 300 ft., at Second and T Streets, N. E., to be known as the McKinley manual training school, for which bids will soon be asked. The engineering department, room

427 District Building, is in charge. A. L. Harris, District Building, is architect.

The Ruth Puncture Proof Automobile Wheel Co., 1311 South Fourth Street, Wilmington, N. C., organized with \$100,000 capital stock to manufacture as indicated, will contract for a portion of the work and maintain an assembling plant, plans for which are now under way. No contracts have been let. T. L. Ruth is president of the company.

The Fulton County Board of Education, Atlanta, Ga., is considering the installation of manual training equipment in the proposed high school at Washington Street and Woodward Avenue, for which plans will be drawn by Hentz, Reid & Adler, Candler Building, architects.

Pittsburgh

PITTSBURGH, Dec. 8.

CONTINUED good inquiry is noted in this district for machine tools and equipment in general, but some of the activity in sales, which developed just after the election, has disappeared and the trade now is looking for a quiet period until after the first of the year. The Pennsylvania Tank Car Co., Sharon, Pa., placed three tools the past week, but most of the orders booked have been for single tools and these have been somewhat fewer than last month. In the heavier lines of machinery, inquiry also is better than actual business.

The power equipment market continues to show a fair degree of activity. A boiler house is among the requisitions of the Duquesne works of the Carnegie Steel Co. for 1925, as it was for 1924. The Crescent Portland Cement Co., Wampum, Pa., has bought from the Westinghouse Electric & Mfg. Co. three 1000-kva. transformers. It still is in the market for a switchboard. A 750-hp. motor will be required for a 32-in. jobbing mill which the Newton Steel Co., Newton Falls, Ohio, will place shortly.

Preliminary plans are being prepared by the Ford Motor Co., Detroit, for a steam-operated electric power plant at its plate glass works at Glassmere, to cost close to \$750,000. Other extensions are planned.

The Universal Steel Co., Bridgeville, Pa., will proceed with the erection of a two-story building on Station Street, to cost about \$55,000, for which a general contract recently was let to E. H. Dobson, Pittsburgh.

Fire, Dec. 5, destroyed a portion of the plant of the Ricks Mfg. Co., Uniontown, Pa., including main foundry and cleaning building, with loss reported at \$65,000 including equipment. Plans are said to be under consideration for rebuilding.

The Guyan Machine Shops, Logan, W. Va., have inquiries out for a wheel press, motor-driven, about 250 tons capacity; also, for a 100 kw. generator, direct-connected to gas engine, 3 phase, 60-cycle, 2300 volts.

The Barbourville Water & Light Co., Barbourville, W. Va., is planning to purchase a 40-hp. gas engine, with accessories.

The Gearhart Knitting Machine Co., Nichols Street, Clearfield, Pa., has awarded a general contract to the Dresser, Minton & Schobell Co., Pittsburgh, for a four-story addition, 35 x 80 ft.

The Board of Education, Indiana, Pa., plans the installation of manual training equipment in its new three-story and basement high school, estimated to cost \$400,000, for which a general contract recently has been let to the J. G. Fullman Co., Inc., E. E. Trust Building, Pittsburgh.

W. G. Haines, 402 East Pike Street, Clarksburg, W. Va., is planning the purchase of re-nickeling equipment, and is desirous of getting in touch with manufacturers.

Pacific Coast

SAN FRANCISCO, Dec. 3.

CONTRACT has been let by the National Electric Sign Co., Oakland, Cal., to the Austin Co. for its proposed one-story plant, 100 x 100 ft., at Thirtieth and Myrtle Streets.

The General Electric Co., Schenectady, N. Y., has begun the construction of a new one-story wire-drawing plant at its Oakland works, East Tenth Street, to be 50 x 120 ft.

Bids will be received by H. P. Sargent, secretary Merced Irrigation District, Merced, Cal., until Dec. 16 for four booster pumping units with accessories. R. V. Melkie is chief engineer.

The Board of Trustees, Eugene, Ore., is planning for ex-

tensions and betterments in the municipal electric light and power plant, including the installation of additional equipment, estimated to cost \$50,000. C. A. McClain is superintendent.

The Podas Foundry Co., 620 North Rampart Boulevard, Los Angeles, has awarded a general contract to the Union Iron Works, 5125 Santa Fe Avenue, for a one-story foundry at Huntington Park, Cal.

The Union Rock Co., 1403 East Sixteenth Street, Los Angeles, has plans for a crushed stone distributing plant on 11-acre tract of land near the line of the Southern Pacific Railroad, Compton, Cal., with hoisting, conveying, loading and other machinery. Bids will be asked about Dec. 15. The engineering department of the company is in charge.

The Katherine Mining Co., Kingman, Ariz., has plans under way for a new ball milling plant with initial daily capacity of about 100 tons. It will cost more than \$200,000 with machinery. R. L. Dimmick is superintendent.

The Merchants Ice & Cold Storage Co., San Francisco, has awarded a general contract to Harold Larsen, Monadnock Building, for a six-story cold storage and refrigerating plant to cost \$145,000 with equipment. W. Torignio, Mills Building, is engineer.

The Sedro-Woolley Veneer Co., Sedro-Woolley, Wash., has tentative plans for rebuilding the portion of its mill, including mechanical drying department, destroyed by fire Nov. 30 with loss reported at \$225,000 with machinery.

The Puget Sound Power & Light Corporation, Seattle, plans extensions and improvements in its hydroelectric generating plant at Dryden, Wash., to cost approximately \$75,000. Additional equipment will be installed. It will also enlarge its power plant at Wenatchee, Wash.

The Salt River Valley Water Users' Association, Phoenix, Ariz., is planning to purchase electric-operated pumping machinery in connection with proposed extensions in its irrigation system to cost about \$450,000.

Gulf States

BIRMINGHAM, Dec. 8.

WORK will begin on additions to the repair shops of the Gulf Coast Lines, Houston, Tex., of De Quincy, La., comprising a one-story machine shop, 130 x 140 ft., power house, 50 x 70 ft., and storage building, 50 x 200 ft., for which a general contract has been awarded to the Orange Car & Steel Co., Orange, Tex. C. S. Kirkpatrick, Houston, is engineer.

Fire, Dec. 2, destroyed a portion of the planing mill and lumber plant of the F. L. Bailey Lumber Co., Marion, Ala., with loss estimated at \$60,000, including equipment. It is planned to rebuild.

The Reed Automobile Co., 301 Chaparral Street, Corpus Christi, Tex., has awarded a general contract to E. E. Hannan, 412 Peoples Street, for an addition to its service, repair and garage building, 75 x 105 ft., for which superstructure work will soon begin.

The General Motors Corporation, General Motors Building, Detroit, has acquired property, 190 x 200 ft., at Sixth Avenue and Twenty-eighth Street, Birmingham, and is said to be contemplating the construction of a branch plant.

Gilbert D. Von Phul, Carondelet Building, New Orleans, has inquiries out for two Babcock & Wilcox watertube boilers, each 150 hp. capacity, with accessories.

The Common Council, Coleman, Tex., is arranging a bond issue of \$105,000, for extensions and improvements in the municipal waterworks, including additions to power house, pumping machinery of larger capacity, and accessory apparatus. Plans will soon be drawn.

The Seminole Bed Spring Mfg. Co., 2027-31 North Miami Avenue, Miami, Fla., is closing negotiations for the purchase of property on N. E. Twenty-first Street, fronting on the line of the Florida East Coast Railway, for the erection of a new plant for the manufacture of metal bed springs, cots, etc., reported to cost about \$75,000. Samuel Dubbin is president and treasurer.

The Dallas Power & Light Co., Dallas, Tex., has completed arrangements for an increase in capital from \$4,500,000 to \$6,000,000, a portion of the proceeds to be used for an expansion and betterment program. C. E. Calder is president.

The Mineola Ice, Light & Water Co., Mineola, Tex., has plans for a one-story addition, 50 x 122 ft., estimated to cost \$45,000. Additional equipment will be installed.

Charles L. Smith, Post Office Box 353, El Paso, Tex., is in the market for two rebuilt wire nail machines and two tack machines, for export to Mexico.

Gleason Brothers, Belcher, La., have preliminary plans for the erection of an electric light and power plant for local service.

The Phillips Petroleum Co., Bartlesville, Okla., has acquired the plants and properties of the Landreth Gasoline Co., Landreth Gas Co., and the Landreth Production Co., Ibex field, near Breckenridge, Tex., for \$4,000,000. The purchasing company has work in progress on an expansion and improvement program, and is said to be planning for extensions in the local plants.

H. O. Ferguson and George Stephen, Bryan, Tex., have acquired a local building and will remodel for an ice-manufacturing plant. Machinery will be electrically-operated. The works will cost approximately \$65,000 with equipment.

The Frost Lumber Co., Montrose, La., is considering the rebuilding of the portion of its saw mill and machine shops destroyed by fire Nov. 25, with loss reported at \$90,000 including machinery.

Canada

TORONTO, Dec. 8.

WHILE demand for machine-tools in this market has not been quite as pronounced the past week as for some weeks previous, inquiries are increasing and there is a large volume of prospective business which, it is expected, will soon be closed. Automobile manufacturers are buying only in a small way, but many are in need of machine-tools for replacement purposes. An active demand is noted for equipment for small repair shops and garages.

The Crown Reserve Mining Co., Larder Lake, Ont., will spend \$200,000 on extension to its mining plant.

The Lake Shore Mining Co., Kirkland Lake, Ont., will increase its milling plant from 300 to 500 tons at a cost of \$200,000.

The Canadian National Railways will build a new car and paint shop at St. Catharines, Ont., to cost \$25,000.

Excavation work is in progress for a plant on Eastern Avenue, Toronto, for the Hoyt Metal Co., manufacturer of babbit metals, etc.

The E. A. Eddy Machinery Co., Providence, R. I., represents interests which have purchased the plant and equipment of the Peerless Jewellery Co., Sherbrooke, Que.

It is reported that the Utah-Idaho Sugar Co., Salt Lake City, has decided to erect a beet sugar factory in southern Alberta to cost \$1,500,000.

The Paymaster Mining Co., Porcupine, Ont., contemplates an expenditure of \$500,000 on an additional milling plant and equipment.

The McIntyre Mines, Porcupine, Ont., proposes to install milling equipment to cost \$2,000,000.

Plans of Pacific Lock Joint & Pipe Co.

The Pacific Lock Joint & Pipe Co., has purchased a 5-acre site at G Street and 88th Avenue, in the Elmhurst district of Oakland, Cal. Equipment will be installed immediately and the plant made ready for operations at once. The firm manufactures lock joint reinforced concrete pipe, specializing in sewer pipe and hydraulic pressure pipe ranging from 12 in. to 9 ft. in diameter. It also manufactures pressure sewer, sub-aqueous culvert and irrigation pipe and fence posts, lamp posts and piles. The officers of the company are: F. T. Crowe, president; A. T. Winsor, vice-president and general manager; F. M. Crowe, secretary; W. W. Brill, consulting engineer.

The Oakland plant will be used as headquarters for State activities, pipe being made at Oakland and shipped to all points of installation. Sand, gravel and material bunkers and a plant building containing about 6000 sq. ft. of floor space will be built immediately. In addition 700 ft. of spur track is now being laid on the property from the adjacent main line of the Western Pacific Railroad. The number of employees will eventually be about 100.

The firm maintains a highly specialized research and analytical department for testing the seepage and absorption qualities of its pipe in different localities. All of its pipe is manufactured in steel and iron forms to insure true dimensions and uniform wall thickness.

Edgar I. Mills, dealer in copper, brass, aluminum, iron and steel, announces the removal of his offices from 280 Broadway to more adequate quarters at 227 Fulton Street, New York.

Net profits of the Canadian Car & Foundry Co. for the fiscal year ended Sept. 30, were \$1,124,321, after depreciation, Federal taxes and interest. This compared with \$1,427,573 the previous year. Profit and loss surplus amounted to \$3,903,869 against \$2,567,143 in 1923.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE, under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates	
Bars:	Per Lb.
Refined iron bars, base price.....	3.24c.
Swedish charcoal iron bars, base.....	7.00c. to 7.25c.
Soft steel bars, base price.....	3.24c.
Hoops, base price	4.49c.
Bands, base price	3.99c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.34c.
Channels, angles and tees under 3 in. x ¼ in., base	3.24c.
Steel plates, ¼ in. and heavier.....	3.34c.

Merchant Steel	
	Per Lb.
Tire, 1½ x ½ in. and larger.....	3.20c.
(Smooth finish, 1 to 2½ x ¼ in. and larger) ..	3.55c.
Toe-calk, ½ x ¾ in. and larger.....	4.20c.
Cold-rolled strip, soft and quarter hard.....	7.00c.
Open-hearth spring steel.....	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds	4.15c.
Square, flats and hex.....	4.65c.
Standard tool steel, base price.....	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High-speed steel, 18 per cent tungsten.....	70c.

Sheets	
Blue Annealed	
	Per Lb.
No. 10	3.89c.
No. 12	3.94c.
No. 14	3.99c.
No. 16	4.09c.

Box Annealed—Black	
	Per Lb.
Nos. 18 to 20.....	4.30c. to 4.45c.
Nos. 22 and 24.....	4.45c. to 4.60c.
No. 26	4.50c. to 4.65c.
No. 28*	4.60c. to 4.75c.
No. 30	4.70c. to 4.95c.

Galvanized	
	Per Lb.
No. 14	4.70c. to 4.85c.
No. 16	4.85c. to 5.00c.
Nos. 18 and 20.....	5.00c. to 5.15c.
Nos. 22 and 24.....	5.15c. to 5.30c.
No. 26	5.30c. to 5.45c.
No. 28*	5.60c. to 5.75c.
No. 30	6.10c. to 6.25c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Welded Pipe	
Standard Steel	Wrought Iron
Black Galv.	Black Galv.
½ in. Butt...—41 —24	½ in. Butt...—4 —19
¾ in. Butt...—46 —32	¾ in. Butt...—11 —9
1-3 in. Butt...—48 —34	1-1½ in. Butt...—14 —6
2½-6 in. Lap...—44 —30	2 in. Lap...—5 —14
7-8 in. Lap...—41 —11	2½-6 in. Lap...—9 —9
9-12 in. Lap...—34 —6	7-12 in. Lap...—3 —16

Bolts and Screws	
Machine bolts, cut thread, 50 and 10 per cent off list	
Carriage bolts, cut thread,	
35 to 35 and 10 per cent off list	
Coach screws, 45 and 10 per cent off list	
Wood screws, flat head iron,	
75, 20, 10 and 5 per cent off list	

Steel Wire	
BASE PRICE* ON NO. 9 GAGE AND COARSER	
	Per Lb.
Bright, basic	4.25c. to 4.50c.
Annealed soft	4.50c. to 4.75c.
Galvanized annealed	5.15c. to 5.40c.
Coppered basic	5.15c. to 5.40c.
Tinned soft Bessemer	6.15c. to 6.40c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire	
BASE PRICE	
High brass sheet	18½c. to 19½c.
High brass wire	18½c. to 19½c.
Brass rods	16½c. to 17½c.
Brass tube, brazed	26½c. to 27½c.
Brass tube, seamless	22½c. to 23½c.
Copper tube, seamless	24 c. to 24½c.

Copper Sheets	
Sheet copper, hot rolled, 21½c. to 22½c. per lb. base.	
Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.	

Tin Plates	
Bright Tin	Coke—14 x 20
Grade "AAA"	Grade "A"
Charcoal 14x20	Charcoal 14x20
IC..\$11.25	\$8.85
IX.. 12.85	10.85
IXX.. 14.40	12.55
IXXX.. 15.75	13.85
IXXXX 17.00	15.05

Terne Plates	
8 lb. coating, 14 x 20	
100 lb.	\$7.00 to \$8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin	
Straits, pig	58c.
Bar	62c. to 65c.

Copper	
Lake ingot	16½c.
Electrolytic	16 c.
Casting	15 c.

Spelter and Sheet Zinc	
Western Spelter	7½c.
Sheet zinc, No. 9 base, casks.....	12c. open 12½c.

Lead and Solder*	
American pig lead	10c. to 10½c.
Bar lead	13c. to 15c.
Solder, ½ and ½ guaranteed.....	41c.
No. 1 solder	38c.
Refined solder	32c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal	
Best grade, per lb.....	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony	
Asiatic	17c. to 18c.

Aluminum	
No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.....	36c.

Old Metals	
Demand from consumers is good and the market continues firm. Dealers' buying prices are as follows:	
	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.25
Copper, light bottoms	9.75
Brass, heavy	7.00
Brass, light	5.75
Heavy machine composition	9.00
No. 1 yellow brass turnings.....	7.75
No. 1 red brass or composition turnings.....	8.25
Lead, heavy	7.75
Lead, tea	6.00
Zinc	4.00
Cast aluminum	16.00
Sheet aluminum	16.00